

clean air *and environmental protection*

January/ February 2000

the bi-monthly journal of the National Society for Clean Air and Environmental Protection vol.30 no.1

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The National Society for Clean Air and Environmental Protection produces information, organises conferences and training events, and campaigns on air pollution, noise and environmental protection issues. Founded in 1899, the Society's work on smoke control led to the Clean Air Acts. More recently NSCA has been influential in developing thinking on integrated pollution control, noise legislation, and air quality management.

NSCA's membership is largely made up of organisations with a direct involvement in environmental protection: industry, local authorities, universities and colleges, professional institutions, environmental consultancies and regulatory agencies. Individual membership is also available to environmental specialists within industry, local authorities, central government, technical, academic and institutional bodies.

Members benefit from joining a unique network of individuals who share an interest in a realistic approach to environmental protection policy; from access to up-to-date and relevant information; from reduced fees at NSCA conferences and training events. They contribute to NSCA's regional and national activities; to environmental policy development; to translating policy into practice; to the Society's wide-ranging educational programmes.

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Editorial

Millennium

For anyone growing up in the latter half of the Twentieth Century, the year 2000 has always been symbolic of a time impossibly far into the future. Indeed, as late as the early Nineties, computer programmers thought the Millennium so far off they only allowed for two figures to mark the year in date codes, hence the dreaded Millennium Bug. Associated with this is a form of procrastination, a feeling that anything planned for beyond 2000, say in 2005, is so far away that there is plenty of time before it comes around, to work out what will actually be done. Whatever one feels about the much hyped passing of the Millennium, it is hoped that it will also mean the passing, or at least the decrease, of this type of thinking.

Along with the Millennium comes the less hyped end of NSCA's Centenary Year. It has been a year of celebration, with commemorative events being staged by the Divisions around the UK and a number of special publications being produced. *Clearing the Air*, the history of the first 100 years of NSCA, of which there are still copies available, provides an excellent study, not only of the Society but also of the environmental policy and legislation it has helped to shape. It has also been a time for contemplation and much work has been put into a reassessment of the priorities and direction for NSCA. The coming of the new year, new Millennium and, for NSCA, new century provides us with an excellent opportunity to rejuvenate the Society, strengthening it and providing it with the impetus to continue shaping environmental policy, legislation and understanding for the next 100 years.

So what does the next year hold? There will be important developments in the next twelve months in all of NSCA's priority areas. January will see the publication of the revised Air Quality Strategy for England, Scotland, Wales and Northern Ireland and many local authorities will be declaring Air Quality Management Areas and developing Action Plans. NSCA will be providing independent help and guidance to all of its members and we will be fighting to maintain the strength of the National Strategy. We will also continue lobbying for, and helping the Government to develop, a National Noise Strategy for the UK and we would hope for significant developments in the next twelve months.

The new year may also see the introduction of a duty for local authorities to promote sustainable development and once again, NSCA will be providing help and advice on this, as well as providing an input on the forthcoming Urban and Rural White Papers. Through our work with the Environmental Analysis Co-operative and through our new Industrial Regulation Commission, we will be advising on the implications for both industry and local authorities of the IPPC regime, due in the first half of next year. The Land Quality Committee will be working on the new contaminated land regime and our Cleaner Transport Forum will be building on its ground-breaking work on Low Emission Zones. These are just some of the activities in which NSCA will be engaged – it's going to be a busy Millennium!



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NSCA News & Views

Response to the Consultation Document: Air Quality Strategy for England, Scotland, Wales and Northern Ireland

On 25 August, DETR published the consultation draft of the revised Air Quality Strategy for England, Scotland, Wales and Northern Ireland – see Clean Air, No. 6, 1999. This marks what is effectively the half way point in the process of revising the original National Strategy of 1997 and the associated air quality objectives. The final version of the revised strategy will appear early in the new year with the Air Quality Regulations being amended, as necessary, at around the same time. The following article is the response by NSCA to the new document, submitted to the Government on 25 October.

Introduction

This document provides the formal response by the National Society for Clean Air and Environmental Protection (NSCA) to the Government's consultation document, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland. It is arranged into four parts – this part deals with general issues and concerns, while the subsequent sections cover Standards and Objectives, Pollutant Specific Issues and Issues for Future Consideration.

NSCA remains supportive of the regime developed by the Government for the control and improvement of air quality in the UK. The central role of the Air Quality Strategy (AQS) gives the regime a cohesiveness and structure not present in other areas of environmental policy. It allows clear links to be made to other areas of Government policy, through the medium of sustainable development, and this function should be further strengthened as the document develops.

Our earlier response covered a wide range of issues and we welcome the fact that the majority of these have, to a certain extent, been addressed by the present consultation draft. One of the most prominent of these is the assertion in Chapter 6 that the next review of the Strategy will “*focus more on the progress being made towards meeting the objectives, rather than on the objectives themselves.*” This apparent shift towards concentrating on delivery mechanisms is welcomed, although the proposed changes to the PM₁₀ objective may preclude some delivery routes being adopted, prior to the next review of the Strategy (see later section on Pollutant Specific Issues).

Changes to the presentation of the air quality objectives lend a great deal of clarity to the proposals, allow easier

comprehension by the public and will make future harmonisation with EU Limit Values easier. A further, welcome amendment would be to set out the objectives as whole numbers only, rather than the one or two decimal places with which they are currently shown. The equipment used to monitor these pollutants cannot, at present, accurately measure lower than unit values. Therefore, to express the objectives with decimal places, simply because the conversion calculations produce these could appear to be overly fastidious.

Welcome changes have also been made to the balance of the Strategy, with a greater weight being given to the policies with which the Government, in conjunction with others, will attempt to achieve the objectives. This is associated with a de-emphasis on the work of the Inter-departmental Group on Costs and Benefits (IGCB) which was included in the Review document. Analysis of the costs and benefits of any policy is, of course, important if limited resources are to be effectively prioritised and we are in no way opposed to the use of these techniques. However, there were concerns that the IGCB work was being given disproportionate weight in the review, especially as this work was far from being either complete or conclusive. We believe, therefore, that the Government is justified in diminishing the role which the IGCB's work will play in the air quality policy process while nevertheless keeping it on stream.

Standards and Objectives

As mentioned in the previous section, the clarification of the objectives which appears in this document is welcomed, although the process could go further. We feel that it should also be emphasised that the objectives are not a ceiling up to which it is permissible to pollute. Rather, the objectives represent a judgement of what it is practical and cost effective to undertake in order to move towards the “no effect level” represented by the air quality standards.

However, the objectives are applied on a national scale and there may be circumstances where cost effective local action can go further. The Strategy should therefore encourage enforcement authorities to take such action, where it is clearly shown to be cost effective, with the air quality standards set as a lower limit value. This is, of course, under the proviso that all relevant stakeholders are fully engaged, in a participative manner, in the decision making process which leads to these actions being taken. Such “no regrets” policies can reap dividends not only in the field of air quality, but in the general improvement of the quality of life of society, particularly in urban areas.

One point of concern is the relationship between the air quality standards and the objectives, particularly in the case of nitrogen dioxide. The standard for nitrogen dioxide is currently 150 ppb, equivalent to 287 µg/m³. The proposed

changes to the objectives reduce the hourly objective for nitrogen dioxide to 200 $\mu\text{g}/\text{m}^3$, in line with the EU Daughter Directive Limit Value. It is fully understood that the NO_2 standard was set according to the recommendations of EPAQS and that amending the standard simply to maintain the relationship between standards and objectives could be deemed unscientific. However, the EU Limit Value also had a basis in science and the AQS does not appear to bring this evidence into the review process. There is no indication that the apparent contradiction of an objective which is lower than the standard has been fully considered and the options for removing it explored. We would welcome such indications as this anomaly undermines the value of the dual standard/objective system which we would seek to maintain.

Pollutant Specific Issues

Particles (PM_{10})

Appendix C to the AQS summarises the responses to the earlier Review of the National Air Quality Strategy. Paragraph 16 states that *"the majority of those commenting did not agree with the proposal to relax the existing [particles] objective"* and it is therefore with some disappointment that we note the maintenance of this proposal in the AQS. Our objections to the proposal lie in two main areas, namely that there is insufficient information currently available to support this proposal and that it will have a severely detrimental effect on the system of Local Air Quality Management.

As has been stated in the earlier responses of both NSCA and others, the proposal to relax the particles objective was based on the projected effect which nationally based policies currently in play would have on future concentrations. The proposal did not appear to take any account of the potential contribution of action at local level, nor was the inherent and significant uncertainty within the modelling work properly brought out. In addition, many of the conclusions from the modelling work, particularly with reference to possible compliance with the EU Limit Value, were based on a conversion of TEOM type measurements to a Gravimetric equivalence. However the relationship between these is not fully understood, is certainly not linear and the value of 1.3 used is subject to wide variance.

Our earlier response concluded that the level of uncertainty present was such that this work could not support the relaxation of the objective for the pollutant which, it is widely acknowledged, is of principal concern in terms of health effects. Since that time, a number of subsequent reports have cast the conclusions of the Government's modelling work into further doubt. That these reports have arisen out of work on the "local" scale in part vindicates our position that any amendment to the particles objective should be delayed at least until the results of local authorities Review and Assessment studies are available. One report of great interest was undertaken by WS Atkins and commissioned by DETR: Evaluation of Transport Measures to Meet the National Air Quality Strategy Objectives. This report concludes that the current objectives for both particles and nitrogen dioxide may be achievable in central London through concerted local action applied in addition to national policy measures. Furthermore, such action can be

carried out in a cost effective manner and therefore need not have a detrimental effect on the local economy. This report undermines the Government's assertion that the current particle objective is unachievable, an assertion which has led to the proposed relaxation.

In any case, the argument that the objective is unachievable and should therefore be relaxed does not fit well against other, similar decisions. For example, the current objective for ozone, while it does not form part of the Local Air Quality Management regime, is acknowledged within the AQS as also being largely unachievable. However, it is not proposed to relax this objective, which is contradictory to the position on particles. Furthermore, air quality is included among the recently launched headline indicators of sustainable development. The document *A Better Quality of Life: a Strategy for Sustainable Development* in the UK states that *"where a trend [in the headline indicators] is unacceptable, the Government will adjust policies accordingly, and will look to others to join it in taking action."* However, in the case of particles, it is not the policies which the Government is adjusting, but the objective and by doing so is discouraging "others" from taking action in tandem with it.

In our earlier response, we argued that the proposed relaxation in the objective will mean that effective action at the local level will simply not be taken, and that this would be a great opportunity missed. NSCA maintains this argument and we feel that the conclusions of the Atkins report lend it further strength. However, we would certainly not advocate the imposition of local measures which were not cost effective or which were significantly detrimental to the local economy. We also advocate an open process for the formulation of local policy packages to address air quality, be they statutory action plans or local air quality strategies. Under such a process, all stakeholders, including businesses and industry, must be fully engaged in the development of control measures.

The air quality objectives must be viewed in the context of the whole system of air quality control in the UK, and not in isolation. Cost effectiveness is built into this system at each stage, from the formulation of objectives to the development of local action plans. Set in this context, the possibility of local authorities imposing draconian air quality management measures becomes more remote. In addition, the Secretary of State retains reserve powers to alter action plans or redirect local authorities' Review and Assessment. With these mechanisms in place, we feel that the Government should be encouraging local action by retaining the current objective rather than discouraging it through this proposal.

Objectives for the Protection of Vegetation and Ecosystems

As in our previous response, NSCA welcomes the introduction of these objectives. However, there are concerns that they have not been developed further since the Review of the National Air Quality Strategy. There appears to be little obvious integration with the requirements of the Habitats Directive and to create what would, in effect, be a dual control system would not be cost effective. In addition, the AQS does not set out the delivery mechanisms for these objectives and without

these, their value is greatly diminished. Given the short compliance dates for these objectives, some further development should be carried out in the near future.

Issues for Future Consideration

In further developing the Air Quality Strategy, both in this iteration and for the purposes of future reviews, we offer the following points for consideration:

Integration with other policy areas – The Government, in preparing the AQS has done much to integrate it with other policy areas, particularly in the environment field. However, one obvious omission is the integration of air quality with the Government's policies on climate change and, in particular, carbon dioxide emissions. Climate change has been identified as the paramount international environmental issue and to disregard it in any policy which deals with emissions to air would be a mistake. There are many areas of common ground between air quality and climate change policies but there are also some areas of conflict. We therefore suggest that the Government, in the next review of the Strategy, looks at the ways in which the common ground can be prioritised and the conflicts resolved.

Aircraft emissions – This area is dealt with in paragraphs 496-499 of the AQS and the overall conclusion is that emissions from aircraft are generally not thought to be a problem, despite a large projected increase in air traffic over the short to medium term. We welcome the fact that the Government is taking a leading role in negotiations over aircraft emissions and understand the difficulties in controlling international traffic. However, recent studies in the UK, for example the recently completed environmental appraisal of Gatwick Airport, have shown that emissions from airports can have a significant impact on the local environment. In the Gatwick example, the projected expansion of the airport could give rise to exceedances of the nitrogen dioxide objective where none currently occur. This form of environmental degradation may well be repeated in many areas of the country where regional airports are expanding very rapidly. The next review of the Strategy should take this fully into account.

International studies – Air quality problems are not, of course, confined to the UK, nor does the UK by any means suffer the worst of these problems. There is a great body of work being undertaken in other countries and regions, some of which is proving highly successful. The opportunity to learn from both the successes and failures of others to improve air quality should not be missed and we urge the Government to consider the merits of some of the innovative solutions being put forward in other countries. These, where suitable, could be integrated into the next review of the Strategy.

NSCA Annual Conference: Environmental Protection '99

This year's NSCA Annual Conference which took place in Brighton, from 25-28 October, was also designated the 13th Regional Conference of the International Union of Air Pollution Prevention and Environmental Protection Associations, of which NSCA provides the Secretariat. The

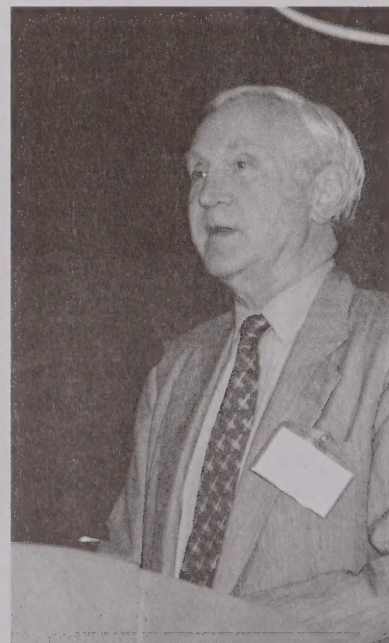


Conference thus addressed a wide variety of topics of both national and international interest across the environmental protection agenda.

The opening address, on Climate Change, was given by Sir John Houghton, former head of the Met Office and past Chairman of the Royal Commission on Environmental Pollution. Sir John set out the scope for action and some of the potential consequences if this action is not taken. Climate Change and sustainable development emerged as the key issues from the week, striking a chord in many of the presentations. Following his address, Sir John was then presented with IUAPPA's international Barthel award by IUAPPA President, Dr. Won-Hoon Park. This award is named after Dr. C.E. Barthel, who was President of IUAPPA 1966-70, and was instrumental in its founding. The award is given to individuals whose work has made a substantial contribution to the abatement of air pollution.

Priorities For A New Century

Sir Crispin Tickell, immediate Past President of NSCA, in his Keynote Address on Tuesday morning, set out the main sustainability challenges which face the global society today, and into the next century. Population increase, soil and land degradation, supply and pollution of water, biodiversity and climate change will all require our



unified attention if we are to avoid the collapse of the global environment as we know it. The priorities for action are to fill the knowledge gaps, develop integrated solutions and to improve access to environmental information. We now have to decide who takes this action and how to measure success, as an alternative to GDP.

Partnerships Hold the Key

The session continued with an international feel, as speakers from around the world highlighted the problems of transboundary air pollution. The subjects ranged from pollution in the Eastern Mediterranean, North America, across Europe and in Northern France. In all cases, working in partnership, across national boundaries and between sectors held the key to progress. The second important factor was the building of consensus, firstly in the scientific community and then between the policy makers and industry.

Rural Sustainability

Ewen Cameron, Chairman of the Countryside Agency, set out the Government's priorities on rural sustainability in the morning's second session. The four main priorities are social exclusion, environmental protection, prudent resource use and economic growth and employment. The Agency's projects attempt to provide environmental, social and economic improvements, creating a win, win, win situation. The discussion session which followed brought out concerns over the integration of rural and urban issues, and that the opinions of local people are fully taken into the policy making process.

Air Quality Still a Problem

Two of the papers on Wednesday morning, from Peter Brimblecombe and Keith Bull, looked at the effects on buildings and on ecosystems, which both have economic and social impacts. Climate change, however, is likely to become the principle driver of air pollution policy with cost benefit analysis playing a major part, as John Dodgson of NERA showed, although there is still much work to be done in this area.

However, it's not all bad news. Jim Longhurst showed that local authorities are making good progress on local air quality management and that there is a high level of enthusiasm and innovation. John Hickman, from TRL, looked at the effect policies are having on transport emissions both nationally and locally. At times controversial, John nevertheless reported that emissions are falling quite dramatically and that local measures have a part to play.



Double Award For Innovation

Local authorities at the leading edge of local sustainability were doubly awarded on Wednesday with NSCA's Innovations in Sustainability and IUAPPA's Hopes for the Future Awards. The awards winners were:

- Westminster City Council for their work on Low Emission Zones and green fleet initiatives (Transport and Air Quality)
- City of Sunderland for their Eco-Ranger educational initiative (Environmental Health and Sustainability)
- Birmingham City Council for their participative development of indicators for sustainability (Implementing Sustainable Development)

The Awards were presented by Transport Minister Lord Whitty, Prof. Kofler of the International Academy of Sciences and by Christian Cleret, President of UKPIA, the award sponsors, whose support will continue next year. In presenting the awards, Lord Whitty said that the winners set an example to both the Government and other local authorities in the implementation of sustainable development, which is particularly important if L.A.s are to hit the December 2000 deadline for the development of Agenda 21 plans. Prof Kofler emphasised the need for innovative approaches if we are to solve the problems of the future and announced that the winners would be put forward for the world-wide Hopes for the Future Awards to be announced in Seoul in 2001.

Living Green, Buying Green

We need to re-populate our urban centres with high density, well designed housing in order to create sustainable urban communities. This was the message from David Rudlin of the URBED Consultancy who are working towards an Urban Renaissance, in the first session on Wednesday morning.

Next on was Bob Ryder, DETR, on the Government's policies to make the goods and services we buy more sustainable. No single method will work and we need to prioritise the impacts of products and find the best mix of methods which will work, including labelling, legal standards and economic incentives.

Tim Brown, in his role as the Deputy Chair of the Consumers Environment Forum, looked at the issue from the Consumers point of view, particularly at the dubious accuracy and usefulness of the "green claims" we all see of household products.

Better Homes and Environments

"Is the National Air Quality Strategy sufficient to protect the health of people in their homes?" was the question posed by Jeff Llewellyn of BRE in the afternoon's second presentation. With relatively high levels of VOCs being generated by household products and levels of NO₂ in homes with gas cooking higher than outside, it is clear that this issues should be seriously considered. The majority of people's exposure to airborne pollutants is within buildings, particularly in the home.

Andrea Cook, of the NEA, gave a comprehensive overview of the issues around home energy efficiency and the schemes available to tackle fuel poverty. It is estimated that cold, damp homes cost the NHS up to £1 billion and that there are still 6 million households in need of support, in terms of their heating and insulation needs. Improving energy efficiency can create employment, improve public health, protect the environment and save money – the first “quadruple win” of the conference.

Burn with Confidence

The last session of the Conference, on Thursday morning, addressed an issue once more coming onto the public agenda – the incineration of municipal waste. Lord Lewis, from Robinson College Cambridge, looked at the environmental impact of modern incineration in comparison with other forms of waste treatment. His conclusion was that the increased use of incineration with energy recovery was probably inevitable in the light of the recent Landfill Directive. If an incinerator is designed and run properly, moreover, it needn't cause any more

environmental damage than other forms of combustion and that the health effects are minimal, particularly when you consider that up to 40% of the UK's total dioxin emissions are from bonfires on 5 November.

The main problem for incineration, and many other industrial processes, is public confidence and concern. Methods for engaging these were covered in Prof. Richard Macrory's presentation on the Royal Commission on Environmental Pollution report, Setting Environmental Standards. The report puts forward a method for the development of standards which put public concerns at the heart of the process and which requires the use of innovative and participative approaches.

Thanks

NSCA would like to thank all of the organisations and staff who helped in the running of the conference, the speakers for giving up so much of their time in preparing their presentations and, especially, to all those who attended the 66th Annual Conference and Exhibition, helping to make it such a success.

NSCA AGM and First Meeting of Council:

All Change at the Top

A new President and Chairman of NSCA Council were elected at the AGM and Council meetings on 25 October. Sir Crispin Tickell, President for the last two years, stepping down said “this has been a memorable year”. Sir Crispin has been a very active and influential President, overseeing the Centenary Celebrations and widely promoting the NSCA cause. Derek Osborn, his successor, is currently Chairman of the European Environment Agency, the Earth Centre and

UNED-UK and has chaired the NSCA's Local Environment Management Forum since its formation two years ago.

Alderman Mrs. Lis Solkhon was succeeded by Keith Horton, Head of Environmental Services for North Somerset, as Chairman of NSCA Council. Lis has, for many years been a strong supporter of the Society, Chairing the former Conference and Promotions Committee. Keith will be taking over the chair at a crucial time in the Society's history, as it moves into its second century and the new millennium.



Derek Osborn, President, receives the Mary Poole badge from NSCA Vice President, Len Poole



NSCA Chairman, Keith Horton, with Lis Solkhon

Christmas and New Year Holiday

The Brighton Office will be closed from mid-day on Wednesday, 22 December, re-opening at 9.00 am on Tuesday, 4 January 2000.

Reports

Turn Up The Noise

Often referred to as the “Cinderella pollutant”, noise occupies a paradoxical position in environmental protection terms. The investigation of noise complaints often occupies the majority of time spent in local authority environmental protection departments and is the one pollutant to which we all have regular exposure. Any member of the general public could relate an experience where their life had been affected by excess noise but a request for the same on air quality would probably draw a blank look. Yet we have a national network monitoring air quality 24 hours a day, sophisticated computer models to predict its trends and a National Air Quality Strategy to co-ordinate policy and action.

It has been suggested that this disparity is not due to the fact that noise is less significant as a pollutant but that it is more difficult to understand, quantify and control. Atmospheric gases are distinct, definable chemicals which are present in the air long enough to obtain consistent measurements. Noise, by contrast, is subjective and transient in nature, is measured in units which even acousticians are hard pressed to explain and has no easily identifiable health effects. Noise does, however, have serious impacts on quality of life, as anyone who lives next to a noisy factory, busy road or inconsiderate neighbour will testify. As a result, the policies and legislation to deal with noise are fragmented, uncoordinated and often antiquated – the concept of nuisance has its roots in the Public Health Acts of the last century and is notoriously difficult to quantify.

However, this could all be set to change as a number of developments in the last year or so start to change the focus and profile of environmental noise. Just as with air quality during the early 1990s, attention is starting to shift from the regulation of individual sources to the measurement and control of levels of noise present in the environment and to the exposure of the general population. As is often the case with environmental issues, much of the driving force is coming from the European Commission, which is currently developing a noise framework directive. This will probably require the measurement and mapping of noise within urban centres and the development of national reduction plans.

Noise is also being seen as a sustainable development issue with the Government Panel on Sustainable Development taking it as one of the key themes for this year. It has asked the Government to produce a statement on its position with regard to the strategic control of noise. In addition, Birmingham City Council has shown that it is entirely feasible to produce detailed computerised noise maps for urban areas in the UK, identifying hotspots and allowing the development and testing of control measures. In response to this, and to lobbying by NSCA and others, the Government has made a commitment to look into the form and content of a national noise strategy. This will provide, for the first time, a coordinated approach to noise in the UK.

The following three articles reflect some of the changing attitudes and approaches to noise in the UK. The first two were prepared, by Colin Grimwood and Philip Wright of the Building Research Establishment, for a seminar on environmental noise organised by NSCA and Oxford's Green College Centre for Environmental Policy and Understanding, on 7 September 1999. This brought together many of the leading authorities on noise policy to discuss future options and obstacles for the advancement of noise policy and a national strategy. The third article, by Steve Phillips from the Transport Research Laboratory, focuses on road noise, the control of which is central to the reduction of ambient noise levels in both urban and rural locations.

STRATEGIC MANAGEMENT OF NOISE: A UK PERSPECTIVE

Philip Wright & Colin Grimwood

Building Research Establishment

This paper is broadly in four parts. Firstly, the drivers for a strategic approach to management of noise in the UK are discussed. Secondly, the analogy with air quality is explored, addressing the implications of important differences between the two fields. Thirdly, a general form and objectives of a noise strategy are proposed; and fourthly, the implications of critical knowledge restrictions are discussed.

Introduction

This paper sets out some of the issues currently being discussed as preliminaries to the potential formulation of an overall strategy for environmental noise management in the UK, in the hope that they will be of some interest to a wider audience. The development of an official strategy in the UK is in its earliest infancy, and there is no certainty that it will be taken forward; although the European Commission's current proposals and lobbying by various pressure groups make it increasingly likely that it will be. The aim of this paper, at this early stage, is to take a step back from the details of the UK's existing noise management framework, and to argue for attentiveness to the peculiar nature of noise as a pollutant - as compared with other widespread environmental issues such as air quality - and the implications of this nature for its effective management. Indeed, the comparison with air quality provides a convenient basis for this discussion, particularly in the UK, where in 1997 the Department of the Environment (now DETR) published 'The United Kingdom National Air Quality Strategy' [1], in recognition of the need for a more strategic and integrated approach to air quality issues.

Drivers For A Strategic Approach

Loopholes in current system: lack of integration of different modes

The present UK system for regulating environmental noise has evolved in a piecemeal fashion. No single agency has had overall responsibility for all aspects of environmental noise policy and legislation, and there has consequently been no readily identifiable over-arching policy. Because of the fragmented nature of the present system, it is possible to identify important policy loopholes. For example, the problem of 'creeping ambient' whereby noise levels (whether due to road traffic, or to commercial activities in urban centres) slowly but inexorably increase in certain areas, is well known. Neither has the present system specifically addressed so-called 'black-spots', where road traffic noise from existing roads has increased to levels which pose unacceptable health risks. In this regard the Government has recently announced a ring-fenced budget for remedial measures at the most serious trunk road black spots.

Furthermore, the lack of integration of the three transport modes, in terms of noise regulation, means that the overall effect of combined noise sources may not always be assessed properly. This lack of integration has been highlighted by the National Society for Clean Air (NSCA) [2], who believe that 'a more integrated and holistic approach to noise policy is appropriate.'

Expert consensus

There is in fact a widespread and growing consensus that, for transportation noise especially, a strategic approach is becoming increasingly necessary. The Royal Commission on Environmental Pollution [3,4], the NSCA [5,6], the Chartered Institute of Environmental Health (CIEH) [7], as well as the European Commission in its 1996 Green Paper [8], have all recently recommended, in one form or another, a more strategic approach than our present one. And demand is also manifest at a local level, where there is a clear need in many areas of noise control to be able to base local plans and decisions on some form of over-arching policy guidance.

There is a general perception that the present UK system is no longer adequate. Evidence in support of this view is frequently presented in terms of an increasing level of dissatisfaction with the noise environment, of complaints, and perceived increases in noise exposure and loss of amenity associated with encroachment of noise into previously quiet times and spaces. This perception is not unique to the UK: the EC's 1996 Green Paper claimed that around 20 per cent of the European Union's population (80 million people) suffer from environmental noise levels that scientists and health experts consider to be unacceptable, and a further 170 million live in so called grey areas, where noise levels are such as to cause serious annoyance during the day time. Although these claims have been questioned by some experts it is generally accepted that, in Europe, environmental noise is one of the main local environmental problems and is becoming an increasingly pressing issue. The 1995 Eurobarometer environment survey found that noise was the fifth most important area of complaint about the local environment in the EU, but was the only issue about which respondents complained more than in 1992. And the Royal Commission, in its 20th report, concludes that there is no evidence that the problem of transportation noise is diminishing, and some suggestion that people are becoming more sensitive to it.

In fact, it is not easy to establish discernible trends in either exposure, complaints, or attitude, so far as transportation noise is concerned. This is made more problematic by the fact that those various data that are available are patchy, and not easily comparable. For this reason the European Commission is anxious to achieve a harmonisation of information. Nevertheless, a study conducted by the Institut National de Recherche sur les Transports et leur Sécurité (INRETS) [9], to inform the development of EU noise

policy, concludes that 'in the absence of ambitious abatement policies, the noise environment risks to remain unsatisfactory or even deteriorate' (sic) and suggests that such a deterioration would result primarily from increasing numbers of noise sources, their wider geographical dispersion, and the spread of noise over time. To address these concerns, strengthened and co-ordinated noise abatement policies are recommended.

Proliferation of sources

In many respects one might say that the present system has worked reasonably well in the past, aided by enormous technical progress in noise reduction at source. Cars, lorries and aircraft, for example, are quieter now than they were twenty five years ago. Ever since the Wilson Report of 1963 [10], much emphasis has rightly been placed on control of noise at source, and current EC directives continue to keep downward pressure on source levels. But while source levels have reduced, the numbers of such sources increased correspondingly, and the two effects have largely cancelled each other out. The 1996 EC Green Paper, for example, points out that the control over individual sources has not achieved a significant overall reduction in exposure levels to environmental noise.

While the number of sources continues to rise inexorably, the technical challenges of reducing source emissions become ever more challenging. A policy which relies on control of noise at source consequently becomes less and less sustainable.

Sustainability

Sustainability is indeed one of the core issues behind the UK Government's White Paper on the Future of Transport, 1998, which sets out new thinking on integrating transport with other aspects of Government policy. Noise is one of the key environmental issues to be embraced by any policy for sustainable development and, as the former European Commissioner for the Environment, Ritt Bjerregaard, has said, 'noise is, with air quality, the most integrated environmental problem at the urban level...'. A policy of sustainable development therefore naturally requires a systematic framework for enmeshing noise management at all relevant levels of decision making. As the Royal Commission suggests, a basic objective of a sustainable transport policy must be 'To improve the quality of life, particularly in towns and cities, by reducing the dominance of cars and lorries and providing alternative means of access.'

EC proposals and developments in instruments and knowledge

The European Commission proposals effectively require a strategic response from Member States. The current proposals are centred around mandatory information collation, in the form of 'noise maps'. The EC has recently issued a draft directive [11] which includes a requirement for the mapping of all large urban conurbations. On the one hand, it is reasonable to regard new technologies allowing such noise maps to be generated as facilitators of strategic responses, since they allow in principle wider effects of alternative policies to be evaluated in a flexible way [12]. In this context the Government's recent support of a

Birmingham City Council initiative to produce such maps has proved an illuminating exercise.

On the other hand, it is true to say that the current proposal for mapping to some extent itself sets up a requirement for a strategic response, since without one there might be a tendency simply to shift noise problems away from those areas that are mapped, at the expense of surrounding areas.

The Analogy With Air Quality

The UK Air Quality Strategy builds upon two trends. It elaborates the principles of sustainable development, attempting to break down barriers between environmental and developmental policy making; and it takes advantage of progress in understanding of air pollution and the tools required to deal with it. In a sense, a comprehensive framework for management of air quality thereby becomes both necessary and possible at the same time.

Parallels with noise

Many of the principles upon which the Air Quality Strategy is based apply directly to noise.

1. *Sustainability*: There is no doubt that noise, like air quality, is a fundamental sustainability issue, with a similar requirement to encourage modes of operation which are sustainable in the long term. As the Air Quality Strategy says 'The thrust of the Government's sustainable development Strategy is to embed environmental policies into other, wider policy considerations.
2. *Transport management*: The Government set out the following principles with regard to addressing air pollution from transport:
 - Reduction in source emissions
 - Tighter controls on the existing fleet, its management and operation
 - Development of environmental responsibilities by fleet operators
 - Changes in planning and transport policies which would reduce the need to travel and reliance on the car.

The aim of the policy is to balance these principles in a cost-effective manner. The link with noise management is explicit in the case of the traffic management policy, one of the aims of which is to reduce noise levels in town centres.

3. *Health and the environment*: The Air Quality Strategy states that air quality is not just an issue of human health: it also affects the natural environment. In noise the parallel may be seen to be with the concepts of amenity and tranquillity. Although direct health effects are hard to demonstrate at lower levels of noise, a parallel may be drawn in terms of a spoiling of countryside and other tranquil areas.

4. *Local management*: The UK's sustainable development strategy acknowledged that good air quality was essential for health etc, but identified a key issue for sustainability as 'to manage local air quality especially in urban areas, and in particular to ensure that all relevant sectors – industry, transport, local authorities and the general public – contribute.' The same applies to noise. Local actions serve

merely as palliatives in the absence of an over-arching strategy, but they are nevertheless a necessary complement to high-level strategy. The Air Quality Strategy acknowledges a significant local dimension to Air Quality, with hot spots likely to occur, and suggests that local air quality management best deals with them. It suggests that local authorities should periodically review and assess the air quality within their areas, including local monitoring and embracement of the principle of sustainable development in terms of traffic management and land use planning.

5. *Effects-based approach:* The Air Quality Strategy is fundamentally effects-based, i.e. its aims are set in relation to the established effects of pollutants on people. Ultimately, any meaningful noise strategy must seek to embrace the same principle.

Divergences

There is clearly in principle a good deal of synergy between the two issues, and a highly significant degree of potential crossover in their strategic management. However, air quality and noise diverge at important points:

1. *Standards and risk assessment:* The Air Quality Strategy adopts standards – defined levels which can be taken to avoid significant risks to health – in terms of pollutant concentration levels, as the basis for its objectives. For some pollutants, such as carbon monoxide, critical thresholds are identified below which effects are unlikely even in sensitive group populations. For others, where there are no clear thresholds, a reasonable judgement is made in relation to the best estimate of continuous exposure-response relationships. The Air Quality Strategy acknowledges the possibility of synergistic effects of pollutants in combination. But no evidence for such effects is found, and the interpretation is rather that the effects of mixtures are additive. Consequently, the standards and objectives are set out on a pollutant by pollutant basis.

Noise does not lend itself to the establishment of standards in quite the same way. It is possible to point to the likelihood of direct health effects at high levels of exposure, but for the majority of the population the link between noise, quality of life and health is not clear.

2. *Sensitive groups:* Determining the effect of pollutants on sensitive groups, such as asthmatics, is a useful means of establishing safe standards of air quality for particular pollutants. Research reveals a wide disparity in individual susceptibility to disturbance from noise, and it may therefore be sensible to think in terms of a psychologically vulnerable group who could perform a similar role. However, there is no convenient *a priori* means of identifying such a group, against which to set standards. There is possibly an argument for setting some standards in relation to the needs of people with hearing and/or visual impairments, but in general the lack of a clear health link at many levels of exposure makes the justification for such an approach difficult.

3. *Local contextual effects:* The local effects of noise cannot be simply predicted in terms of exposure response relationships, except in the very broadest sense. This is because the effects of noise are psychological constructs, which will vary very significantly from one community to another, according to particular concerns and expectations.

Similarly, the concept of amenity is very important in noise, and means that relatively low levels of noise can be highly damaging in certain situations: in destroying the tranquility of the countryside, for example. The psychological dimension, which is of fundamental importance in considering the effects of noise, is entirely absent when considering the effects of air quality, except perhaps in relation to odour. For this reason, a health-effects basis for setting standards for noise exposure is more difficult to embrace.

4. *The role of commerce and industry:* These have a key role to play in the Air Quality Strategy, since a significant proportion of total emissions are from industrial sources. But industry is a less significant contributor to noise emissions, causing more localised effects.

5. *Trans-boundary pollution:* Long range air movement means international agreement on the management of certain trans-boundary pollutants forms a crucial part of the Air Quality Strategy. Such considerations do not generally arise in noise.

The Objective And Structure Of A Noise Strategy

The analogy with air quality suggests how noise likewise should be addressed in a co-ordinated way at every level of infrastructural planning and decision making, from high level strategic planning of roads, airports and railways, to local traffic management measures and planning decisions; in sympathy with economically and environmentally sustainable integrated transport policies. Notwithstanding the divergences discussed above, many of the instruments used in the Air Quality Strategy: national initiatives, local action plans, enforcement of best practice in relation to industrial and commercial noise, a local and national monitoring network and noise mapping, would all form valuable components of an effective overall strategy.

An objective

But any strategy needs first of all an overall objective or aim, the strategy itself being a plan of action towards that objective, aligning policy and regulation in relation to it. Thus the NSCA recommends firstly the establishment of a clear view of what should be achieved by noise policy, as a precursor to a more general framework to be put in place to make it happen. One might state the general objective of a noise strategy as simply: 'To minimise environmental noise within an economically and environmentally sustainable transportation, commercial and industrial infrastructure.'

The procedures for the design and planning of such an infrastructure should then be rationalised so that they are always mediated in an appropriate way by the above aim; and the aim ultimately is achieved by ensuring universal consideration of the effects of noise in any existing or future scenario, as set against other equally valid considerations such as economic development, cost, safety etc. Furthermore, the rationalisation of all systems for the management of noise must ensure that all sources of noise are addressed in a coherent and collective way.

Effects basis

As with Air Quality, any successful noise strategy will need to be effects-based, i.e. formulated in such a way as to

minimise the effects of noise, rather than noise per se. Thus the strategy must not only seek to moderate direct adverse effects, such as annoyance or sleep disturbance, but must also seek to promote amenity – the loss of which must be considered an adverse effect – in such a way as to preserve and extend pleasant environments wherever possible.

Stratification by level and land use

As the divergence from the air quality model makes clear, a noise strategy cannot support the adoption of absolute standards or targets framed simply in terms of percentage of the population exposed to particular noise levels, since this would indeed ignore important effects such as loss of amenity. Nevertheless, such targets may be the best policy in relation to high levels of noise, where direct health effects are demonstrable. The strategy may need to be stratified accordingly, to be sufficiently sensitive to the implications of different degrees of noise exposure in different situations. For example, a crude stratification may be imposed along the following lines, according to broad levels of noise and/or land uses:

- **Low.** Mostly rural, demanding a particular emphasis on policies in relation to effects on amenity, including the protection of designated recreational and/or tranquil areas.
- **Medium.** Mostly urban/suburban, demanding noise-sensitive zoning and planning etc. to minimise the effects of transportation and commercial activities.
- **High.** Mostly urban and/or close to arterial roads, caused by high levels of road traffic or aircraft noise. Likely to demand specific amelioration measures, and possibly the adoption of absolute noise level standards where chronic health effects are demonstrable.

Overall targets within each stratum would need to be set and measured across a sufficiently sophisticated range of effects criteria, possibly including percentage of population exposed for the highest degrees of noise, and percentage of rural and other land suffering loss of amenity for the lowest levels.

For the majority of the population, exposed to medium levels of noise, a number of parameters will need to be taken into account in order to measure progress against adverse effects, but this will not be straightforward. The widespread effect of annoyance, for example, is difficult to measure directly and may be confounded by changing expectations. In fact it is possible that a strategy which successfully reduces environmental noise emissions may, by increasing public awareness, cause annoyance levels to increase. Indeed, this was one of the reported outcomes of the Darlington Quiet Town Experiment [13], where ‘increased sensitivity to noise’ may have occurred as a result of the traffic management and publicity schemes that were introduced.

Knowledge Restrictions

The challenge of developing sufficiently sophisticated indicators of effects, against which to set targets and measure progress and benefit, is a considerable one, but one which any successful environmental noise strategy must be prepared to meet. Much the same challenge faces the present EC initiatives. Unfortunately, there are a number of

highly significant areas of weakness in the knowledge base which can be brought to bear on the development of a robust effects-based noise strategy.

Effects of noise sources in combination

Despite much research effort over the years, there is still no generalised method for assessing the effects of noise sources in combination. For example, the recent recommendations for a system of environmental noise metrics made in the Dutch Health Council Committee’s report [14] – which have carried great import in the context of the current European initiatives – are put forward on the basis that annoyance attributable to a specific dominant source is not greatly affected by the presence of another source. On the wider issue of deriving aggregation rules to allow such metrics to predict the general annoyance engendered by a combination of two or more sources, the committee holds fire and acknowledges the likely difficulty of such an undertaking.

Change relations

The dose-response meta-analysis which forms the basis for the proposals in the Dutch report, in common with most noise-effect data, is concerned with response to steady-state noise environments. For this reason the proposed metrics are not intended to be applicable to situations where the noise environment is changing (or has recently changed) significantly. This severely limits the field of application of such metrics as predictors of adverse effects, since they cannot legitimately be applied to establish the benefits or disbenefits of alternative scenarios leading to changes in the noise climate except in the long term.

Context-specific effects

The traditional approach to the study of the effects of noise has been to examine the relationship between an index of noise exposure and an index of human response or attitude, averaged across individuals within a particular community or exposure group. But the importance of the particular context is clear when the results of studies are compared, often revealing wide divergences between particular community responses. Synthesis studies allow single relations to be distilled, but it is disingenuous to regard the results of such studies to be revealing of some ‘underlying’ relation. In fact, no way of taking into account (or even identifying) important contextual effects when predicting response of individual communities has been developed, which means that only very general predictions of community response are possible.

Indices of amenity

There is no widely accepted means of establishing the effect of noise on amenity, yet for large areas of land it is loss of amenity which is likely to be the primary detrimental effect of noise. Particular land-use categorisations can be made, and sensitive areas identified, but a relatively sophisticated way of assessing potential enjoyment and expectation is likely to be necessary before the true effects of noise can be judged in this context.

Noise cost-benefit aggregation

Notwithstanding the lack of data on change relations, techniques such as noise mapping allow predicted differences

in population noise exposure patterns to be examined as a function of various what-if scenarios, for example in relation to road routing. But there is little basis for trading off the costs and benefits (purely in noise terms) of alternative schemes. How does one establish the aggregate effect of, for example, a relatively large decrease in noise for a few individuals against a smaller increase for a greater number? And is it even sensible to try? Any noise strategy will necessarily be involved with establishing the relative costs and benefits of alternative scenarios, yet the general absence of absolute effects thresholds significantly problematises such equations.

Conclusions

There is a growing and persuasive case for a rationalisation of the UK system of noise management, and the development of an official strategy. The analogy with air quality is a valuable one for this purpose, but important differences between the two fields must be borne in mind, especially in relation to the way in which standards and objectives are formulated. The development of noise policies, both in the UK and throughout Europe, is likely to encounter real difficulties caused by the variegated nature of noise effects. Such complexities should not be ridden over rough-shod, but must be attended to with the sophistication they demand.

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TRENDS IN ENVIRONMENTAL NOISE

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Given that noise pollution should be a central issue for the both the 'sustainable development' and 'integrated transport' debates, it is perhaps surprising that the issue has only recently moved onto the strategic agenda. However, as this paper will show, there is a lack of data and information available to inform a strategic debate on noise pollution in the UK. This largely results from our short term, local based, and problem solving approach to most environmental noise issues. However whilst many noise problems are of a local nature, the most predominant noise sources are not. Transportation noise in particular is a long-term national, European and International issue closely bound up with the economic and social infrastructure. In this paper the noise sources discussed have been restricted to transportation noise (road, rail, air), with some mention of industrial/construction noise and neighbour noise.

Introduction

Noise has particular characteristics that distinguish it from other kinds of environmental pollutants, such as chemical agents. What constitutes noise is largely subjective - one person's noise being another person's music. Sound, or noise, is part of everyday life and is necessary for the proper functioning of the human body. Sound, or noise, is also intrinsically linked to economic prosperity. Increased material wealth in society results in more noise sources and more noise sources lead to a reduction in the quality of life. As the former European Commissioner for the Environment, Ritt Bjerregaard, once said: 'Noise is, with air quality, the most integrated environmental problem at the urban level...'

In order to ascertain trends in environmental noise it is necessary to try and obtain information on both exposure (has the total amount of noise changed?) and response (has people's sensitivity or tolerance to noise changed?). The

information available conveniently falls into a number of categories, these being:

- Trends in the prevalence and noise output of the noise sources themselves
- Trends in noise complaints
- Trends revealed by measurements or predictions of noise levels
- Trends revealed by social surveys of the effects of noise.

The remainder of this paper uses these headings to structure the discussion of trends in environmental noise.

Trends In The Prevalence And Noise Output Of Transportation Noise Sources

At the strategic level transportation is the most prevalent source of environmental noise. Both the 1990 National Noise Incidence Survey (BRE)¹ and a 1971 National Noise Survey (TRL)² found road traffic noise to be the most dominant noise source and that it was audible outside approximately 90% of the sites surveyed.

Road traffic noise

Between 1984 and 1994 the number of cars in England and Wales increased from just over 16 million to about 20.5 million, and the distance they drove increased significantly and is projected to continue growing. The recent Government White Paper states: ‘With increasing prosperity, more people with driving licences and several million new households likely over the next two decades, we are faced with dramatic increases in traffic. Over the next 20 years car traffic could grow by more than a third. Van and lorry traffic is forecast to grow even faster.

The overall characteristics of road traffic noise result from a combination of the noise generated by the individual vehicles in the traffic stream. At low speeds noise from the vehicle engine tends to predominate, whilst at higher speeds (over about 50 km/h for cars and 80 km/h for trucks)

noise from the interaction of the tyres and the road surface tends to predominate. In parallel with the growth in car ownership and increases in traffic volumes there has been significant progress in reducing the mechanical noise from road vehicles over the past twenty years or so. Several vehicle manufacturers now feel that tyre/road noise has become the dominant source over a wide range of vehicle speeds. Re-design of vehicle tyres and the development and use of quieter road surfaces, with appropriate regard to safety issues, are most likely to continue the industry’s progress in noise reduction.

Aircraft noise

In the UK we have two of the world’s busiest international airports: in 1996 there were over 428,000 take-offs and landings at Heathrow and 212,000 at Gatwick; over 55 million people used Heathrow in 1996 and 24 million used Gatwick. The DETR has committed to prepare a UK airports policy, that amongst many issues will require aviation to meet the environmental costs (presumably including noise) which it imposes. In this respect the outcome of the Heathrow T5 enquiry and its handling of the noise impact of the proposed Heathrow expansion is awaited.

Air traffic at UK airports is expected to grow at an average of 4.5% per annum between 1995 and 2015 under the mid-point of the 1997 DETR air traffic forecasts (3.2% and 5.5% in the low and high demand scenarios respectively). Total air traffic using the mid-point forecast is expected to increase by 139% over the forecast period. Average annual growth rates in numbers of terminal passengers have generally been declining over time as the market moves towards maturity, falling from above 12% in the early 1960s, to close to 5% between 1990 & 1995³.

The growth in air transport is a controversial issue with, it seems, every conceivable political, economic, environmental, and social ramification. Over the past 25 years considerable effort has gone into tackling aircraft noise at source. There are now two international Noise

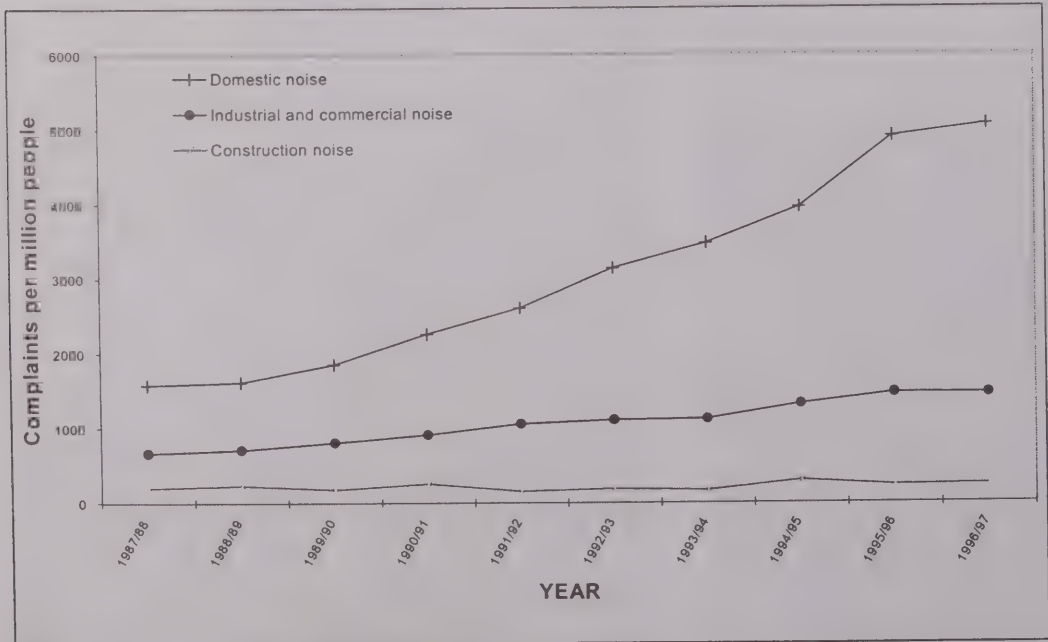


Figure 1: Noise complaints to local authorities (1987-1997)

Certification standards - Chapter 2 and Chapter 3. There have been two world-wide phase out programmes aimed at non noise certificated aircraft (pre Chapter 2) and an ongoing phase out of Chapter 2 aircraft. In the UK, the Secretary of State can apply operational controls to designated aerodromes (Heathrow, Gatwick and Stansted) which currently include:

- noise limits and noise preferential routes for aircraft taking off
- noise reduction procedures for aircraft taking off and landing
- restrictions on night flying.

The industry maintains that a careful balance is being maintained between expansion and the environment with increased flight numbers being offset by technological improvement and strict regulatory controls. Others would argue that existing noise regulations merely provide a framework for the expansion of the aircraft industry.

Railway noise

Passenger train services increased from 309 million kilometres in 1984 to 350 million kilometres in 1993/94, an increase of approximately 13%. Railtrack predict that passenger travel within the UK will show an annual increase of around 2%. The franchise bids of the train operating companies forecast demand growth of nearly 25% in terms of passenger mileage by 2002/03. Activity in the freight transport market correlates with the level of economic activity. Between 1984 and 1994 (when GDP increased by around 27%), annual freight movements measured in tonne-kilometres increased by around 20%.

Rail vehicle noise emanates from three main sources. The wheel/rail interface, the engine and auxiliary power systems, whilst at high speeds (over 100 km/h) aerodynamic noise predominates. The railway industry has made progress in the field of providing acoustic comfort for passengers but does not appear to have been as active as the automobile and aircraft industries in achieving reductions in unwanted external noise emissions. The current decentralised UK railway industry may present particular challenges in establishing a suitable, practical and co-ordinated framework to ensure noise reduction from railways. There is, however, some activity at the European level on reducing environmental noise from railways. Noise standards are being developed for new freight wagons and high speed inter-city trains. A voluntary agreement to reduce the noise from existing freight train wheels is being progressed.

Trends In Noise Complaints

The CIEH Annual Reports contain statistics about noise complaints made to local authorities. Similar data is reported in the DETR Annual Digest of Environmental Statistics. The trend in local authority noise complaints is shown in Figure 1 above. This shows that complaints about environmental noise issues to local authorities continue to rise. The most recent CIEH Annual Report⁴ states that 173,436 complaints about domestic noise were received in 1996/97. In the period between 1987 and 1997 the total

number of domestic noise complaints has trebled. The number of complaints about industrial and commercial noise was 50,636 in 1996/97 and 8,065 complaints about construction noise were made in the same year.

Complaint data cannot give a complete picture of public attitudes to noise, as there are many reasons why a complaint may or may not be made. In particular, people tend not to complain if they think that nothing can or will be done about an issue. Local authorities do not have powers to deal with complaints about transportation noise and therefore report very few such complaints. In fact, there is no national structure within which complaints about transportation noise can be lodged and no legal framework within which such complaints can be investigated. Consequently meaningful national data does not exist for transportation noise complaints.

Trends In Measured Or Predicted Noise Exposure

As part of a strategic approach to noise control one would expect information to be collected on the numbers of people / proportion of population / number of dwellings / number of noise sensitive receivers / area of land exposed to certain noise levels. These noise levels could be determined by actual field measurements as part of a national monitoring programme or from theoretical computer derived noise contours or noise maps as part of a national noise mapping exercise.

Some limited information of this type is collected in the case of aircraft noise and is published in the DETR Digest of Environmental Statistics. A recent Digest⁵ reports that 'areas and numbers of people affected by noise around many airports have not been increasing as quickly as air transport movements and aircraft passenger numbers'. Comparable information for other noise sources does not appear to be available.

The most relevant information, for mixed environmental noise sources, is that collected by BRE during the 1990 National Noise Incidence Survey⁶. This study which involved 24hr noise measurements at 1,000 representative sites found that:

- 56% of the population of England and Wales is exposed to day-time noise levels exceeding the WHO level of 55 dB L_{Aeq} chosen to prevent significant community annoyance.
- 63% of the population is exposed to night-time levels exceeding 45 dB L_{Aeq} which the WHO claims is desirable to meet sleep criteria.
- road traffic noise was audible outside 92% of dwellings.
- 7% of dwellings that faced main roads were exposed to noise above 68 dB $L_{10,18hr}$ which is the qualifying level for sound insulation works under Noise Insulation Regulations for new roads.

There is only one similar previous study to allow comparison with these findings and that was undertaken by the then TRRL in 1972². The mean $L_{A10,18hr}$ for the 1990 survey was 55.6 dB, slightly lower than the mean $L_{A10,18hr}$ of

Noise Index and Year		% of population (cumulative) exposed to noise levels				
		>30dB	>40dB	>50dB	>60dB	>70dB
L _{A10,18h}	TRL 1972/3	-	100	80	27	5
	BRE 1990	100	99	77	26	4

Table 1: Distribution of noise levels outside dwellings (1972/3 – 1990)

57 dB found in 1972. Table 1 shows a comparison of the proportion of the population exposed to different noise levels which also suggests very little change in the noise environment between the two studies.

Commentators have suggested that other changes, such as the spread of noise in space and time, may have occurred but there is no national data available to support such claims. More information on noise trends, including these more subtle changes, will become available in due course as BRE is repeating the National Noise Incidence Survey during 1999/2000 in a manner that will allow a more detailed examination of trends over time. Modern computer based noise mapping techniques are also capable of producing useful information for this type of trend analysis, but again there is no published information and very little such work in hand.

An important issue to note is that the TRL and BRE studies discussed above are population based using measurement sites where people are living. There is little or no national data available on the degradation of tranquil areas or SSSEs.

At the local level a few local authorities, most notably Birmingham City Council, have undertaken some limited strategic monitoring of noise trends. Birmingham compared noise levels in 1994 with levels in the early 1980s at a few sites in the city and found that:

- day-time road traffic noise levels at sites adjacent to busy roads had not increased;
- night-time road traffic noise had increased by around 2 dB (L_{A10,6h});
- night-time background noise had increased by around 2 dB (L_{A90,6h});
- day-time and night-time railway noise had decreased by around 5 dB (L_{Aeq}).

The apparent spread of noise into the night is not unexpected. During the day, when roads are already busy, a 25% increase in road traffic volume would only result in about a 1 dBA increase in noise level. At night, when the roads are quieter, only a few extra vehicles or a slight change in traffic composition might increase the noise level to the extent that Birmingham reported.

At the time, Birmingham City Council expressed concern about the apparent increase in night-time noise although the relevant committee report does not contain any plans to deal with the issue. The City Council have subsequently

become the first local authority in the UK to undertake a comprehensive city-wide noise mapping exercise which illustrates the current noise climate of Birmingham and may facilitate a more strategic approach to noise management in the future.

Trends Revealed By Social Surveys Of The Effects Of Noise

Social surveys are a more reliable source of information on attitudes to noise than complaint data. However, in general such surveys are conducted for different purposes using different questionnaires and methodologies and it is difficult to compare results of different surveys in order to determine trends.

Limited evidence from national social surveys conducted by BRE and TRL suggests that the proportions of people who are adversely affected (emotional effects - annoyance, irritation etc & activity disturbance - sleep interference etc) by the main sources of noise have stayed about the same in recent years.

Approximately 1 in 3 respondents to a 1991 national noise attitude survey of over 2,000 adults, conducted by BRE, said that environmental noise spoiled their home life to some extent. In this 1991 survey 28% of respondents objected in some way to road traffic noise, 16% to aircraft noise and 4% to railway noise. The main findings of several recent national social surveys are summarised in Table 2 below^{6,7}.

Table 2 shows that the previous social survey in 1985 reported 11% bothered by road traffic noise, 7% bothered by aircraft noise and 1% bothered by railway noise. It is difficult to determine trends from this data because there appear to be effects introduced by the type of survey (dedicated surveys reporting higher %s) and the questions used (the 1991 survey using a wider classification descriptor based on various objections to noise). The surveys undertaken in 1985 and 1992 using the same methodology and the same questions produced very similar results.

However, taken overall, rather than suggesting a shift in public attitudes, the evidence suggests that the proportions of people adversely affected by environmental noise may have been underestimated in the earlier surveys. Again, more information on trends in public attitudes to environmental noise will become available as BRE is repeating the national noise attitude survey later this year.

Over the past 40 years, numerous field studies have related the results of social surveys of reaction to the noise and various measures of noise exposure. The studies have

Type of Noise	Survey Details			
	1971 TRL Road Traffic Noise Survey Dedicated Type “Bother”	1985-1987 BRE Neighbourhood Noise Survey n=14,406 Omnibus Type “Bother”	1992 BRE Test survey n=2,000 Omnibus Type “Bother”	1991 BRE National Noise Attitude Survey n=2,373 Dedicated Type “Object/irritate/ disturb/concern/ annoy/upset/ nuisance”
Neighbours	-	14%	14%	22%
Road Traffic	23%	11%	11%	28%
Aircraft	13%	7%	7%	16%
Trains	2%	1%	2%	4%

Table 2: Social surveys of noise annoyance (1971 – 1991)

examined many noise indices and the effects of respondent related variables such as age, sex, socio-economic status, attitudes pertaining to the noise source, and susceptibility to noise. Synthesis reviews of these studies indicate that remarkably similar relationships exist between noise exposure and reaction across different cultures and different measurement techniques. However, only a small percentage (typically less than 20%) of the variation in individual reaction is accounted for by noise exposure.

A meta-analysis of 464 findings from 136 surveys by Fields⁸ suggested that annoyance from a specific noise source was related to noise exposure, the amount of isolation from sound at home and to five attitudes (fear of danger from the noise source, noise prevention beliefs, general noise sensitivity, beliefs about the importance of the noise source, and annoyance with non-noise impacts of the noise source). The meta-analysis found that annoyance is not affected to an important extent by ambient noise levels, the amount of time residents are at home, the type of interviewing method, or any of the nine demographic variables (age, sex, social status, income, education, home ownership, type of dwelling, length of residence, or receipt of benefits from the noise source).

A synthesis review of 12 research papers by Hall⁹ investigated the dose-response relationship across different sources and found different functions for different sources (e.g. road and rail noise), for different types of one source (e.g. air carrier airports and general aviation airports), and even for different studies at the same location (Heathrow). The review was unable to reject the idea that this was all a random variation about an ‘average response’ but recommended that it was sensible to use source type to categorise the differences. ‘Noise source’ forms a useful surrogate for a number of non acoustical characteristics (such as headlight glare, fear of accidents) which cannot be separated from acoustical factors in correlation analysis: it is also relevant from the point of view of differing

accountabilities for the noise produced by the various transportation modes etc.

The majority of dose-response studies to date have been in situations where a single noise source dominates. In general these studies produce dominant source related response differentials that are broadly consistent with the assertion that for a given noise level, annoyance from aircraft noise > road traffic noise > railway noise. In real life a noise source rarely completely dominates another because of differences in the temporal, spectral, and directional characteristics of the noise and because of habituation effects in the individual and in the community.

Some Final Comments

In the EU, more than 20% of the population is estimated to be living in areas along roads where the noise level exceeds 65 dBA during the day, 2% are living in corresponding areas along railways and only 1% in airport surroundings¹⁰.

When the noise impact of transportation as a whole is looked at in this way it is difficult to avoid the conclusion that road transport (particularly the motor car) is the most important transportation noise source for this strategic debate. However, at a local level, particularly for people living under flight paths, near railways or in dwellings with poor sound insulation this will clearly not be the case. The local impact and the role of non-acoustic factors in determining public reaction to noise must not be overlooked.

Further, the implications of initiatives being made in the name of ‘sustainability’ and ‘integrated transport’ to influence land use planning and travel behaviour may shift this debate in the future – in terms of noise sources, noise exposure, public perception, public attitudes and complaints. It is crucial that the noise implications of such policies are thought through at every stage of the decision making process: perhaps noise is actually the most integrated of all environmental issues.

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TRAFFIC NOISE UPDATE

Steve Phillips

Transport Research Laboratory

As one of the most widespread forms of public noise nuisance and with increased public awareness, traffic noise is becoming an increasingly important issue for the automotive and highway sectors. Of course the problem is not a new one and as a result TRL has been working closely with industry and government bodies for many years. However our activities over the last year have covered a particularly wide variety of exciting developments with vehicles, tyres and road surfacings, traffic management and modelling, and prediction studies.

Testing of Tyre Noise

With a large high-speed road network, tyre/road noise is one of the dominant sources of traffic noise and a number of developments have taken place recently. Legislation is looming in both the UN-ECE and EC for the type approval testing of tyre noise. The development of the legislation has taken a number of years since TRL first developed the pass-by test method for the European Commission in the early 90s. Much of the recent work has focused on ensuring that the test regimes developed are appropriate and that due attention is paid to the need to ensure that other desirable tyre characteristics, such as adhesion, are not compromised. At the time of writing it is anticipated that the European Directive for tyre noise type approval will be approved this year, however this is just the first step and we are already beginning to consider the planned revision of the legislation. We have also been working with researchers in other countries and are following their national initiatives, such as Germany's Blue Angel Eco-label for low-noise, fuel saving tyres.

Road Surfaces

Of course tyres are only part of the equation and more emphasis is now placed upon the lowering of noise levels with the selection of road surfacings. Consequently, recent additions to the Design Manual for Roads and Bridges (DMRB) section covering surfacing materials now stress the importance of noise more than previously. Indeed, it is largely as a result of the issue of noise that the use of traditional surfacings such as Hot Rolled Asphalt (HRA) and Brushed Concrete is now restricted on high-speed roads in England and Wales. Greater emphasis is now being placed on the *new, quieter surfacings, such as the proprietary thin surfacings and Exposed Aggregate Concrete. The bituminous thin surfacings are the most widely used and it is for these that type approval has now been developed under the Highway Authorities Products Approval Scheme (HAPAS) which is being introduced by the British Board of Agrément (BBA). As well as assisting with the development of a range of other performance specifications, TRL refined its Statistical Pass-by (SPB) method for the purposes of the noise test. With this procedure, it is hoped that highway authorities will now be able to specify the choice of materials with considerably better information about their acoustical characteristics. Surfacing contractors also benefit because they are now able to obtain an objective noise assessment of their various surfacings and TRL Environment's noise survey team has been busy keeping up with the demand.

However, while the SPB method does provide a basis for the type approval of surface noise, it does have a number of important drawbacks that restrict general applicability for other purposes such as compliance testing. Firstly, the method requires that a number of site selection criteria be

fully met for the results to be valid. These include the need for measurements to be made on a straight and level section of road at an open site with no large reflecting objects in the immediate vicinity. Secondly, because the measurement is made at a specific location, the results can only be related to a relatively short section of road surface and generally only in the nearside lane. This means that the variability in noise due to inhomogeneity of the texture characteristics in the road surface's construction cannot easily be determined. Because of these drawbacks, the SPB method cannot be introduced generally for the specification and checking of a road *surfacing's acoustical properties at any arbitrary road location.

Testing Road Surfaces

In order to address the limitations imposed by the current method, TRL have built a special noise testing vehicle that will provide highway authorities and surfacing contractors with a practical method of assessing surfacings for their acoustical properties. On Noise Action Day in July, TRL unveiled this brand new tyre/road noise investigation vehicle to the TV and press. Called TRITON, the new vehicle uses the proposed ISO Close-Proximity, or CPX, method for testing. This involves the measurement of tyre noise using a microphone that is mounted near a specified test tyre running in the wheel-track. Typically the microphone will be located at 200 mm or 400 mm from the tyre sidewall. This method offers high precision and reproducibility and measurements are relatively simple to carry out.

TRITON is based upon a 10 Tonne truck chassis with a body specially designed to house and isolate a test tyre and supporting equipment. Although the vehicle is based upon a larger capacity vehicle, it has been 'down plated' to 7.5 Tonnes for operational purposes. This allows the vehicle to travel legally at the maximum test speed of 110 km/h (70 mph) on UK motorways. In fact the vehicle can travel even faster on a closed test track where prototype surfacings and tyres are tested. The loaded test tyre is housed in an anechoic enclosure with four of its microphones positioned at the standard CPX locations. Initially tests are planned with the four designated test tyres proposed by the ISO group working on the subject, although it is planned to test a wider range of passenger car tyres of different dimensions.

The noise and speed of the test wheel are measured over each individual 10 m length of a road surface during testing. Air temperature, road surface temperature and the tyre inflation pressure, temperature and load are also monitored continuously. As a result the data storage requirements are considerable and all tests are monitored in a control room adjacent to the test chamber. The double-skinned enclosure and associated shielding on TRITON is designed to ensure the measurements of the test wheel are not contaminated by any external noise sources making tests practical even on busy roads.

To compensate for the influence that other traffic may have on the ability of the test vehicle to maintain a constant test speed, analysis systems will normalise results to specified test speeds. This analysis consists of calculating the regressed levels for each individual 10 m section from the data collected during a series of test runs over the same

length of road. The measurement system is synchronised on each separate test run by the use of a reflective panel and an infrared triggering system located at the roadside. By calculating, for each separate 10 m section of the test surface, the regression statistics between measured noise levels and the vehicle speed it is possible to examine the variation in noise along an entire section of road.

Investigations are underway to determine the relation between close-proximity noise levels and roadside SPB measurements for a range of road surfaces. A statistically significant relationship has been found in previous work although the limited data collected suggested that, currently, far field (i.e. roadside) noise levels could not be accurately predicted from the close-proximity results, particularly for porous surfaces.

Some of this discrepancy associated with porous surfaces is due to the influence on the propagation of noise and, because of the location of the microphone relative to the tyres, the CPX method will in many cases over estimate the noise from porous road surfaces. However the methods by which porous surfaces can be measured are not straightforward and it is only recently that they have been considered for standardisation. Traditionally, the acoustical performance of porous road surfaces was measured by extracting sample cores from the road and subjecting them to tests in the laboratory. Clearly this destructive method does not lend itself to routine measurement and a number of alternatives have, or are being, developed. For example, an ISO Working Group has recently proposed a standard method for the in-situ measurement of acoustical absorption of road surfaces. In this proposed method, the so-called 'extended field' method, the measurement system directs a defined pulse of sound from a source placed above the surface being tested and determines the absorption characteristics by analysing the reflected signal. It is expected that such a method could allow the determination of a correction factor to be applied to CPX results for porous surfacings.

Of course, in addition to the CPX method, there is a need to fully consider a number of alternatives and supplementary methods of determining the influence of road surfaces and tyres on noise generation. For example it is well known that the texture of the road surface largely determines tyre/road noise levels. Direct measurements of the road surface texture are more straightforward than the measurement of noise since they are less susceptible to the influence of the weather and can be carried out routinely from mobile devices, such as the UK Highway Agency's HARRIS high-speed road monitoring vehicle. Therefore research is being carried out to develop further the understanding of how texture influences tyre/road noise and to develop equipment that would provide the information on the road surface texture characteristics that is required to be able to predict noise levels. On some types of surfaces good agreement has been found between noise levels and certain texture characteristics. However, while this is encouraging there is still a considerable way to go before a truly comprehensive method can be found which will apply to all surface types. Therefore TRITON is also being used in

extensive research to gain a better understanding of the mechanisms of tyre/road noise generation.

These new methods of assessing roads surfacings will of course ultimately feed into the revision of traffic noise prediction methods such as the UK's Calculation of Road Traffic Noise (CRTN). But the road surface is only one aspect that needs to be considered and research is also continuing on other aspects of CRTN. This research includes consideration of the need to extend and refine CRTN's capabilities in particular for the increase of the prediction distances and to examine the potential benefits from the use of other measures such as Leq and of the inclusion of spectral characteristics. In addition, through our involvement in the European Commission's Working group on harmonised noise prediction methods, TRL is also helping to bring together the various methods found in different countries for road and rail predictions.

Research into New Test Methods

We are also working on a number of directly vehicle related topics. One aspect of this is a result of the on-going international debate on the revision of vehicle noise type approval test method to make it more representative of actual driving conditions. This has arisen because, despite the very large reductions in engine noise over the last three decades of European vehicle noise type approval legislation, there has not been a measurable reduction in the relative levels of traffic noise. One reason for this is because the test is a relatively harsh acceleration test that tests vehicles

under conditions that are relatively rarely found in practice. Another factor is that during the current test the contribution of the tyres has now become such a dominant source that, with the current test, manufacturers cannot make worthwhile noise reductions from the other components. This is one reason why the European vehicle manufacturers have been in favour of the separate tyre noise test, however this new test does nothing to temper the enthusiasm for fitting wider tyres to vehicles which is one reason why TRL has recently found that in certain situations newer vehicles produce higher noise levels than older models. TRL is an active participant of the international working group on this topic and proposals for alternative test methods will be made in due course. Of course the engine and tyres are not always the most noticeable noise source. Our studies of noise and traffic calming schemes have found that body noise from large goods vehicles can be a problem. TRL has helped to address this problem by writing a guide to best practice for the reduction of goods vehicle body rattle. The Guide, which was produced in collaboration with industry, is due to be published by the DETR soon. Vehicle operators who follow the Guide will be able to demonstrate their commitment to reducing the impact of their operations on the community.

This is just an example of TRL's wide ranging activities and for more information about TRL's research and consultancy activities visit our web site: www.trl.co.uk/environment

(email: environment@trl.co.uk or drop us a fax on 01344 770918).



Centenary Posters

Included with this edition of Clean Air is a leaflet illustrating the NSCA's set of four A2 (420mm x 594 mm) Centenary Posters.

The posters were originally £20 per set but we are now able to offer them to members at just £6 per set. This price is inclusive of VAT and p&p.

To order either send a cheque made payable to NSCA or if you are from a Local Authority, an official order. Visa, Mastercard, Diners Club and American Express cards are also accepted.

Update

IPPC delayed

The UK has failed to meet the 31 October 1999 deadline for implementation of the EU IPPC Directive. While the draft Regulations were published for consultation in August 1999, the Regulations are unlikely to be in place until the end of February 2000.

Air Quality Regulations

Draft new Air Quality Regulations for England reflecting the proposals in the new Air Quality Strategy (see Clean Air, No. 6, 1999) were published for consultation at the end of October. The new Strategy is expected to be published early in 2000, with the new Regulations taking effect shortly after.

Particle Emissions from Construction Sites

Particle emissions are generated at every stage of the construction process: demolition, earthworks, construction and landscaping. The sources are widespread and include materials (e.g. cement, plaster and other powdery or fibrous substances), activities (e.g. earth movement, sanding, routing, drilling, crushing etc) and equipment (such as generators, grinders, vehicle exhausts). A number of control methods have been identified and care will be taken to select those that offer the most practical and cost effective solutions.

Currently, there is no formal advice for controlling particle emissions from construction activities and this can cause problems for local authorities in the management of local air quality. BRE is now developing a draft Code of Practice on controlling such emissions. The work is being carried out on behalf of the DETR and in collaboration with the construction industry and regulatory authorities.

The new Code will, for the first time, provide the construction industry and regulatory authorities with a common set of guidelines to follow. It will be of interest to all those who are involved in construction activities: manufacturers of construction equipment, suppliers of monitoring equipment and Environmental Health Officers. In due course, the Code may become a condition of planning approval.

BRE is holding a seminar on 20 January at Garston, Watford, to explain the objectives and the details of the Code and to look at the health and environmental issues that have driven the project. Delegates will have the opportunity to raise questions and discuss implementation issues.

If you wish to attend the seminar or would like more information about BRE's work in this field, please contact Dr. Vina Kukadia, tel. 01923 664878, fax. 01923 664095, e-mail. kukadiav@bre.co.uk

DETR Planning Website

A definitive list of Government planning policy guidance is now being published on the Internet by DETR on www.databases.detr.gov.uk/planning/npp/.

It lists the guidance contained in Departmental circulars, planning policy guidance notes, minerals policy planning notes and regional planning guidance notes. The list will also include key statements to Parliament, a list of research reports and best practice advice.

The site is to be developed to in due course to allow access to the text of all PPGs and MPGs.

Alternatives to the School Run

'Autoholic' parents who ferry their children everywhere by car are increasingly being accused of harming their children's physical and psychological development – let alone contributing to traffic congestion and pollution. The daily school run is a particular target with various estimates suggesting that up to 20% of morning rush hour traffic in urban areas at the peak time of 8.50 am is caused by children being taken often short distances to school by car.

There are, however, now many good examples of successful schemes to encourage journeys to school on foot or by bike, while the concept of 'safer routes to school' can be complemented by more use of car sharing and public transport. In many areas schools are producing 'school travel plans', with some local authorities making such plans a condition of the planning process for new schools.

DETR has appointed specialist sustainable travel consultants Cleary Hughes Associates, working in conjunction with Allott Transportation to establish a database of all available classroom material on the subject of school travel. This will bring together currently available data from the DETR, Sustrans, local authorities, transport lobby groups and private sector organisations. It will also include published material that can be used in the classroom that regularly appears in professional publications, individual resources and links, where available, to allow users to order materials or download them directly in a ready-to-use format.

While the emphasis will be on travel between home and school, as the most relevant to the classroom and pupils' experience, much of the material will also raise wider questions about travel and transport.

Cleary Hughes Associates would like to hear from producers or users of relevant classroom materials – particularly from those outside mainstream government and local authority transport and planning fields. Contact Jo Cleary at 51 Wood Lane, Hucknall, Notts NG15 6LR; phone/fax 0115 964 1869; email: clearyhughes@btinternet.com.

Members News

Members! Are we covering your news? Please check that your press office has *Clean Air* on its mailing list.



Calor Autogas and Conoco are collaborating to install liquefied petroleum gas at a number of Jet petrol stations. Glenda Jackson is shown opening the first Jet LPG pump in London. Jet has also announced that it will provide the LPG for the new fleet of London Transport buses which will take passengers to and from the Millennium Dome in Greenwich.

Powergen and Nottingham City Council are combining in a major scheme to promote the use of electric vehicles in Nottinghamshire. Using funding from the Energy Savings Trust Powershift project, grants worth £300,000 will be provided to businesses and local authorities to purchase up to 60 new electric vehicles.

Watford BC have implemented the first phase of a Green Zone initiative, aiming to develop a residential neighbourhood which is no longer dominated by motor vehicles. The zone is similar in concept to the Home Zones currently being piloted by a number of authorities, but covers a wider area. Speed restrictions and improved pedestrian facilities are planned, and residents will be involved in the design of road improvements.

Reading BC claims to be the first authority in Europe to replace its refuse collection fleet with trucks powered by liquefied natural gas. Thanks to a mixture of funding from Powershift, cheaper fuel and lower vehicle excise duty, the council expects to save £38,000 immediately and a further £9,000 a year in fuel costs.

Stanger Science & Environment's asbestos consultancy has been awarded an HSE licence to supervise work with asbestos insulation and coatings. The company already works extensively in managing asbestos removal for local authorities and property managers. Details on 0345 585605.

Camden Council has a new green website covering air quality, travel, urban development, wildlife and a state of the environment report, and they have produced a lot of stickers and mousemats to promote it! <www.camden.gov.uk/green>.

Croydon and Sutton Councils are working with the private sector and local transport operators to promote Green Travel Plans. Using Single Regeneration Budget funding, they are organising a series of breakfast meetings for local businesses.

Information: Jessica Walker at W A Fairhurst, 01789 470512.

Divisional News

The **South East Division** reception, hosted by the Corporation of London at the Guildhall, was a real success, with a range of Divisional member organisations represented. Some non-member authorities were also invited to give a taste of the benefits of membership, and the Division will be following up with membership information in the next few weeks.

The **West Midlands Division** centenary conference was hosted by Birmingham City Council. Members enjoyed presentations on air quality, local transport plans and the future priorities of NSCA, before taking a trip on the new metro system.

The **Scottish Division** is branching out into some interesting policy areas, with seminars on light pollution on 25 November, and electromagnetic fields and telephone masts on 15 February.

As we go to press, our **East Midlands Division** is heading off to a Divisional meeting at the Bass Brewery in Burton-on-Trent, to hear presentations on environmental considerations for breweries, and for a tour of the plant. No doubt Divisional Secretary Dr Bill Pearce will receive high praise for his organisational capabilities!

Thank you to all our members who returned the NSCA Conference Questionnaire included in the last edition of Clean Air. The information will help us to plan more effectively for future events. Congratulations to Mr V Emmerson of Copeland Borough Council, who wins the complimentary case of English wine which we offered as an inducement to return the forms. The winning form was picked at random by our Administration Officer Sally May.

FORTHCOMING NSCA EVENTS

Tuesday 15 February

Contaminated Land

Training Seminar - NEC Birmingham

Thursday 6 and Friday 7 April

Spring Workshop

Staverton Park, Northamptonshire

Thursday 11 May

UK Dispersion Model Users Group

Workshop - London

Tuesday 13 June

Training Seminar - NEC Birmingham

Tuesday 12 September

Noise Update 2000

Training Seminar - NEC Birmingham

Monday 23 to Thursday 26 October

Annual Conference and Exhibition - Scarborough

Environmental Protection 2000

Tuesday 14 November

Training Seminar - NEC Birmingham

Thursday 23 November

UK Dispersion Model Users Group

Workshop - London

For further details please contact

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clean air *and environmental protection*

March/April 2000

the bi-monthly journal of the National Society for Clean Air and Environmental Protection vol.30 no.2

- *Environmental Challenges for the New Millennium*
- *1999 Innovation in Sustainable Development Awards*

nsca



National Society for Clean Air and
Environmental Protection

Transport and Air Quality: national policy, local action

Friday 10 March 2000

Royal Society of Arts, London WC1

This year local authorities begin declaring air quality management areas, and must include air quality objectives in local transport plans. Cleaner technologies and traffic management measures will both be used to tackle pollution hotspots in city centres.

For a brochure and further information contact NSCA on 01273 326313



Environmental Protection 2000

- new date

Monday 25 to Wednesday 27 September

- same venue

Scarborough

MARCH/APRIL 2000

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The National Society for Clean Air and Environmental Protection produces information, organises conferences and training events, and campaigns on air pollution, noise and environmental protection issues. Founded in 1899, the Society's work on smoke control led to the Clean Air Acts. More recently NSCA has been influential in developing thinking on integrated pollution control, noise legislation, and air quality management.

NSCA's membership is largely made up of organisations with a direct involvement in environmental protection: industry, local authorities, universities and colleges, professional institutions, environmental consultancies and regulatory agencies. Individual membership is also available to environmental specialists within industry, local authorities, central government, technical, academic and institutional bodies.

Members benefit from joining a unique network of individuals who share an interest in a realistic approach to environmental protection policy; from access to up-to-date and relevant information; from reduced fees at NSCA conferences and training events. They contribute to NSCA's regional and national activities; to environmental policy development; to translating policy into practice; to the Society's wide-ranging educational programmes.

**NATIONAL SOCIETY FOR CLEAN AIR
AND ENVIRONMENTAL PROTECTION
(Founded 1899)**

Registered Charity, Number 221026

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Editorial

The Power to Innovate

In this issue, we profile the winners and runners-up of the *Innovation in Local Sustainable Development Awards*, which NSCA ran for the first time last year, supported by UK-PIA. The Awards are aimed at local authorities, with the intention of spreading good practice in the application of sustainable development at the local level. We received entries from authorities across the country and reflecting a wide variety of projects, from large area wide initiatives through to small neighbourhood centred projects. If you think your local authority deserves recognition for its work on local sustainability, the Awards are running again this year - watch this space for details of how to enter.

Also on the sustainable development front, the Local Government Bill currently making its way through Parliament contains new powers for local authorities to do "anything which they consider likely to" promote the economic, social and environmental well-being of their area. There are also powers to develop strategies for promoting or improving economic, social and environmental well-being, powers to enter into partnerships with other organisations, powers to consult with relevant persons, and so on. This almost fulfils the government commitments, made in the Modernising Local Government White Paper in 1998, but crucially falls short of a duty to promote sustainable development and mandatory strategies tying together economic development plans, spatial development plans, transport plans and Agenda 21 plans.

While the new powers will enable the more forward thinking local authorities to develop their community leadership and sustainable development roles, their application will not be universal. This will lead to the sort of patchwork success which Local Agenda 21 enjoyed until the Prime Minister set his now famous deadline for all local authorities to develop an Agenda 21 Plan. However, the declaration was made at a time when LA21 was losing its novelty appeal and Best Value was the initiative of choice. Let us hope this is not the fate of the new powers to promote well-being.

January saw the final publication of the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, *Working Together for Clean Air*, following many months of consultation. While the new Strategy does not contain any major surprises, its publication means that we can move on from wrangling about the air quality objectives to the much more positive issue of developing action plans and local air quality strategies. Having said that, it should be remembered that the, still contentious, objective for particles is only a "staging post" and may change again in the next review. As some local authorities have already pointed out, it may be that local policies cannot move fast enough to accommodate these changes and that local strategies will maintain the old objective as their focus. This too is based on sound, rational and sensible thinking, just as the objectives in the new Strategy are, illustrating the need for real consultation when setting nationally based but locally applied policy.

FORTHCOMING NSCA EVENTS

Friday 10 March

Transport and Air Quality

Conference - RSA, London

Thursday 6 and Friday 7 April

Spring Workshop

Air Quality Management

Staverton Park, Northamptonshire

Thursday 11 May

UK Dispersion Model Users Group

Workshop - London

Wednesday 17 May

Particles

Conference - RSA, London

Tuesday 13 June

Training Seminar - NEC Birmingham

Tuesday 12 September

Noise Update 2000

Training Seminar - NEC Birmingham

Monday 25 to Wednesday 27 September

Annual Conference and Exhibition - Scarborough

Environmental Protection 2000

Tuesday 14 November

Training Seminar - NEC Birmingham

Thursday 23 November

UK Dispersion Model Users Group

Workshop - London

For further details please contact

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NSCA News & Views

ENVIRONMENTAL CHALLENGES FOR THE NEW MILLENNIUM

Sir Crispin Tickell GCMG KCVO

Immediate Past President, NSCA

This key note speech was presented at NSCA's Annual Conference, held in Brighton from 25-28 October 1999.

Introduction

Let us reflect on the world at the end of the last millennium. In China there was the Sung dynasty, with its giant metropolitan centres, paintings and poetry; Islamic culture stretched from Spain to central Asia and northern India; in Mexico lowland Mayan civilization had collapsed, and the Toltecs were building the city of Tula; in Africa there was Arab culture in the north, the kingdoms of Kanem and Ghana with their stone houses in the west, and the waning influence of the Ethiopian empire in the east; while in Europe Cluny abbey had just been rebuilt for the first time and Europe was becoming an exporter of industrial products.

A thousand years later the planet is also on the threshold of a new era: the industrial revolution of the 19th century is being replaced by the communications revolution, with globalisation through the Internet, Email, and other new technologies.

I have even been thinking of the end of the next millennium. At a conference near Seattle in September we considered the prospects for humanity in 3000. There were the techno-optimists (equipped with a certain amount of wishful if rueful thinking); the catastrophists (who saw us reduced to the level of the uncomprehending Easter Islanders when the Dutch arrived among the ruins at the beginning of the 18th century); and the rest of us somewhere in the middle, hoping for the best and fearing for the worst.

Let us go back to today. What place does the environment occupy at this milestone? There is the rise in environmental awareness, illustrated by popular use of such phrases as the greenhouse effect, burning rainforests, the ozone hole and the Niño. From being something on the outside and essentially peripheral, the environment has taken a new place in public consciousness and the process of decision-making. At the same time there is increasing recognition that industrial society is unsustainable on its present course. The nub of the problem is the realisation that the industrial way of life is endangering planetary health in the widest sense.

1. Current Environmental Issues

The greatest change on the cusp of the millennium is change itself. A time traveller from outer space would see

more changes in the last 20 years than in the preceding 200, and more change in the last 200 than in the preceding two millennia.

The main problems are interconnected. First population increase. There has been a giddymaking increase in human numbers from some 10,000 individuals perhaps 100,000 years ago to some 10 million at the end of the last ice age, perhaps 11,000 years ago. In 1800, when Malthus first identified the link between population and resources, the population was 1 billion. By 1930 it had risen to 2 billion and it reached 6 billion people earlier this month. By 2025 there may be 8.5 billion people in the world. Eighty million people are added to earth each year. It is difficult to calculate the carrying capacity of the earth, and its regions, for our species but most analysts concur that we are vastly exceeding it. I give three examples of the hazards; each connects with the others.

First human health: the World Health Organization estimates that poor environmental quality contributes to 25% of all preventable ill health in the world today. Problems such as contaminated water, poor sanitation, smoky indoor air and exposure to mosquitoes and other disease vectors are still the primary environmental factors in ill health. Insufficient water supplies, inadequate sanitation and poor hygiene are primarily responsible for global outbreaks of cholera and other diarrhoeal diseases, which claim three million lives each year, mainly in non-industrial countries. Exposure to pesticides, fertilisers and heavy metals poses health risks through soil, water, air and food contamination.

We now also have to contend with the emergence of some 30 new diseases over the last 20 years, including AIDS, Ebola and haemorrhagic illnesses. Rapid, unplanned urbanisation has resulted in conditions that encourage the spread of diseases such as dengue fever.

Second human conflict: the environment is a major casualty of modern methods of warfare, which shows no sign of abating. In the recent conflict in Yugoslavia the destruction of chemical and petrochemical complexes in Serbia led to the pollution of the Danube river, causing problems in the downstream countries of Bulgaria and Romania. Prospects of proliferation of nuclear weapons and use of biological weapons are even more alarming. Environmental degradation and resource shortages may themselves cause armed conflict. This may result from

severe water shortages, widespread desertification and toxic contamination.

Third refugees: the numbers are constantly rising. Environmentally driven refugees already exceed the more familiar number of politically driven refugees. Numbers have risen from 6.8 million in the 1960s to at least 20 million today.

The second major problem is deterioration of land quality and accumulation of wastes. According to the United Nations Environmental Data report of 1993/94, 17% of soils worldwide have been damaged to a greater or lesser extent since 1945. The movement of people into cities, where almost half the human species now lives, and industrial contamination of various kinds are accentuating the process.

The next process is pollution of oceans and rivers. Take the oceans. Seals in Antarctica which have never seen a human being nevertheless have PCBs in their blubber. There is the increasing incidence of toxins produced by blue-green algae along rivers and coasts, which poses health risks. There is also evidence of accelerating destruction of the world's coral reefs by pollution. More than half the world's reefs are potentially threatened by human activities. In its 1995 report, the British Government Panel on Sustainable Development recommended the establishment of an Intergovernmental Panel on the Oceans, a recommendation it repeated in its 1999 report.

There is also deterioration in the quality of fresh water in both rivers and aquifers the world over. At the same time demand for fresh water is doubling every 21 years while supply remains as it has for millennia. According to GEO-2000 (Global Environment Outlook 2000), the United Nations Environment Programme's Millennium Report on the Environment, published last month, about 20% of the world's population currently lacks access to safe drinking water, while 50% lacks access to a safe sanitation system. Global freshwater consumption rose sixfold between 1900 and 1995, more than twice the rate of population growth.

Next is depletion of the diversity of life. Current destruction of other forms of life is up to a thousand times what it would be under natural conditions, and this could increase many times more in the next millennium. There is a general impoverishment of the biosphere.

Eighty per cent of the forests that originally covered the Earth have been cleared, fragmented or otherwise degraded. Logging, mining and other large-scale projects threaten 39% of the remaining natural forests. In 1996 the IUCN estimated that 25% of the world's mammal species and 11% of the bird species were globally threatened – that is at significant risk of total extinction.

It is impossible to set money values on the natural environment, but recent efforts to do so are at least indicative. The first ever attempt at quantifying the global value of natural services, published in *Nature* in May 1997, estimated that as a median figure they are worth around US\$ 33 trillion. Compare this with the current GNP of all countries in the world, which is about US\$ 28 trillion. Another paper in *Nature* in February 1998 proposed various

economic instruments that would allow investors to obtain economic returns from environmental assets, such as forests and landscapes, whilst ensuring their conservation.

Then there are the changes we have brought about in the chemistry of the atmosphere. Strenuous efforts have begun to abate atmospheric pollution in many industrial countries but urban air pollution in its many forms is reaching crisis dimensions in most large cities in the non-industrialised countries. Road traffic, the burning of coal and high-sulphur fuels, and forest fires are the major causes of air pollution. Whether particulate matter, ozone, or acid rain, air pollution is an international problem. The recent burning of forests in Indonesia, which affected the atmosphere throughout South East Asia is just one example. Improving the scientific and policy mechanisms to manage and reduce transboundary pollution is a major challenge for the next few decades. We shall be hearing later today from Jan Thompson, Chairman of the Convention on Long Range Transport of Air Pollution in Europe of the progress made in the last 20 years.

Depletion of the stratospheric ozone layer is serious. Damage to the human metabolism may seem alarming to us, but a more fundamental problem could be the effects on other organisms, including phytoplankton at the base of the food chain. Then there is climate about which we heard last night from Sir John Houghton. The key conclusion of the Intergovernmental Panel on Climate Change (whose Working Party on the science he co-chairs) is that ".....the balance of evidence suggests a discernible human influence on global climate".

There is also growing understanding of the links between atmospheric problems such as local air pollution, acid rain, global climate change and stratospheric ozone depletion. Isolated responses to one problem may worsen another. For example catalytic converters on cars decrease nitric oxide emissions and help reduce acid rain and urban smog, but they release higher levels of nitrous oxide which is a potent greenhouse gas, and their manufacture causes a range of other environmental problems.

These issues – population increase, land degradation, water shortages and pollution, loss of biodiversity, and climate change – have to be seen together to make sense of them.

Some new issues are also emerging. Evidence is mounting that human activities are seriously unbalancing the global nitrogen cycle. Intensive agriculture, fossil fuel combustion and widespread cultivation of leguminous crops has led to huge additional quantities of nitrogen being deposited into terrestrial and aquatic ecosystems. Human activities have at least doubled the amount of nitrogen available for uptake by plants. This has a number of consequences: increased levels of nitrogen in drinking water supplies, necessitating costly purification systems; atmospheric pollution and resulting acidification; unwanted plant and algal growth in many freshwater habitats and coastal areas; reduced plant diversity; and damage to ecosystems.

Exposure to chemical agents in the environment – such as lead and mercury, industrial solvents and some pesticides – has been implicated in numerous adverse effects on

humans, from cancer to birth defects. However there is far less knowledge about the toxicological effects of a number of new chemicals coming onto the market, which may be present in household products. Exposure to hazardous chemicals can result from industrial and transportation accidents and from inadequate management and disposal of wastes. Concentrations of heavy metals and persistent organic pollutants (POPs) are of particular concern. POPs are fat-soluble toxic chemicals that do not easily degrade, persist for many years in the environment, concentrate up the food chain, and accumulate in animal and human tissues. There are further concerns that certain POPs called endocrine disruptors may be involved in reproductive abnormalities, and neurological and immunological defects in humans and other animals.

Together these changes amount to an acceleration of environmental change unprecedented since humans became an identifiable animal species. Most of them can be attributed to the industrial revolution and the culture of globalised development that has spread to nearly all human species.

2. Movement of Power

But increasingly, individual governments find this culture - or model - defective in important ways. It brings out the difficulties in reconciling environment and politics. It also brings out problems of governance: in short how to cope with issues outside - or mostly outside - the power of the nation state. The result has been a switch of focus. It is a three way movement:

- There is movement upwards to international institutions such as the United Nations to cope with the problems on a world agenda: financial flows, health, arms proliferation, refugees, famine relief, trade, above all the environment. Globalisation is out of any one's control.
- Then there is the downward movement of power to regions, local communities and people who want to run more of their own affairs, and achieve - or recover - a more distinct identity. Impersonal government from far away is increasingly resented.
- Last there is the sideways movement of power from individual to individual all over the world. The transistor radio was perhaps the first product of information technology to bring people together. It is heard even in the Amazonian jungle. Television, E-mail and the Internet, for those who have them, have followed.

3. Outlook

According to GEO-2000 the beginning of a new millennium finds the Earth caught between two conflicting trends. A wasteful consumer society, coupled with continued population growth, is threatening to destroy the resources on which human life is based. At the same time many people - but not nearly enough - are struggling against time to reverse these trends and introduce sustainable practices that will ensure the welfare of future generations.

We each of us have our own priorities for remedial action. Let us look briefly at those suggested in the GEO-2000 report. It sets out three broad categories. These include unforeseen events and scientific discoveries: for example the possible effects of introducing genetically modified organisms on gene pools; the rapid evolution of microbes, viruses and some insects; or the enormous disruption that chemicals could have on ecosystems and human health.

Second there are the sudden, unexpected transformations of old issues, for example sudden release of chemicals which have accumulated over many years in soils, sediments, lakes and other reservoirs; surge in the number and severity of forest fires and natural disasters; coral leaching; or biological invasions by non-indigenous species. Last night Sir John Houghton, rightly cautious, said that the IPCC conclusions were generally in the middle. But the extremes are always possible.

Then there are the already well-known issues to which the present response is inadequate, such as nitrogen overload, environment-related disasters, degradation of coastal areas, chemicals that persist in the environment, species invasions, climate extremes, global water crisis, land degradation, urbanisation, environmental impact of refugees, and vulnerability of small island states.

A survey of 200 scientists in 50 countries (conducted by the Scientific Committee on Problems of the Environment of the International Council for Science) on environmental issues that will require attention in the next century found the following issues to be most important:

1. climate change (51% of respondents mentioning issue)
2. freshwater scarcity (29%)
- 3= deforestation/desertification (28%)
- 3= freshwater pollution (28%)
5. poor governance (27%)
6. loss of biodiversity (23%)
7. population growth and movements (22%)
8. changing social values (21%)
- 9= waste disposal (20%)
- 9= air pollution (20%)

Most expected that the major environmental problems will follow from the continuation and aggravation of existing problems that currently do not receive enough policy attention. Many scientists also emphasised the interlinkages between climate change and other environmental problems.

Action in the 21st Century

GEO-2000 recommended that future action be focused on four key areas. The first was filling knowledge gaps, for example identifying indicators, and providing institutional, technical and other resources needed to improve monitoring and data collection. The second was tackling root causes, for example designing new policies that reduce the role of subsidies, and designing policies that favour

alternative energy use and encourage the adoption of energy efficient technologies. The next action was taking an integrated approach, for example promoting sustainable development as the central theme in policies relating to agriculture, trade, finance etc. by stressing the high economic and social value of environmental goods and services; and by working towards integrated policies at national level. Finally there was mobilising action, such as improving public access to environmental information, making environmental education part of the standard educational curriculum, and encouraging the media to devote more attention to environmental issues.

GEO-2000 concluded that the global system of environmental policy and management is moving in the right direction but much too slowly. To change a way of running a society as well as a way of thinking about the world generally is no mean undertaking. The power of inertia is immensely strong.

There are two other issues that particularly concern me. First is the increasing difficulties that all governments, with no exceptions, have in governing. This goes with the three

way movement of power I referred to earlier. It was also a central conclusion of the book *Beyond the Limits* published in 1992 by the authors of the famous *Limits to Growth* of 1972. The second issue is the need to measure things differently. We have a distorted view of the world and our quality of life because we measure the wrong things and work to a perverted set of values. The GNP/GDP system gives a deeply misleading impression. The key question is how to establish true costs. As has been well said, markets are superb at fixing prices but incapable of recognising costs.

How is the world to change? We need three things. First is leadership by individuals from above. Margaret Thatcher showed this on climate change, as did Al Gore before he became Vice President, and Mikhail Gorbachev after he left office. Secondly we need public pressure from below, such as the role of Greenpeace in the Brent Spar episode, and the role of consumers and GMOs. Last we need felicitous catastrophes to jerk us out of our inertia, preferably not too big, not too small, not too long, not too short, and not affecting anyone in this room or the NSCA in its centenary year.

CONTAMINATED LAND

Response by NSCA's Land Quality Committee to the DETR Circular and Draft Guidance

Introduction

The Land Quality Committee of the NSCA brings together a wide range of interests in contaminated land from regulatory bodies, local authorities, academia, business and consultancies. Its purpose is to promote consensus on appropriate policies and their effective implementation.

This note sets out the Committee's views on the Circular, Regulations and Guidance issued by the Department on 8 October 1999, which are intended to implement the new arrangements for dealing with contaminated land contained in Part IIA of the *Environmental Protection Act 1990*. The Committee recognises that the main content and substance of these papers has already been the subject of extensive consultation. Nevertheless it believes that there remain further important issues which call for comment.

Summary of Key Points

The new regime is complex. Extensive training for local authorities backed by full and clear guidance will therefore prove more than usually important to successful implementation. DETR and the Agency must promote this.

Regulations or transparent procedures should be introduced to ensure that there is no unreasonable delay by the Environment Agency or local authorities to signing off sites once required work has been completed.

While the definitions for contaminated land are reasonably clear, there remains significant scope for ambiguity and misunderstanding. Notwithstanding the formal role of the Courts, the Department and the Environment Agency

should endeavour to offer further clarification and advice on a number of points.

Detailed Comments

Definitions. While the definition of contaminated land and other definitions are reasonably clear, the Committee is concerned in particular that:

- the definition of significance for contaminated waters is an improvement, but there remains a risk of confusion and overlap with the *Water Resources Act*;
- the definition of 'disease' remains obscure, and it will prove difficult to determine 'significant harm' in relation to disease.

More generally, it is clear that a great deal of contaminated land will fall outside the statutory definition. It will be important to monitor the impact of the new regime to ensure it does not operate as a constraint on, or disincentive to, appropriate remedial action.

Risk Assessment. In general adequate data is likely to be available for risk assessment, except on certain issues such as plant toxicology. Greater transparency is however desirable in the process itself, and further guidance (in particular on how limitations of data are to be treated) is needed.

Allocation of Liabilities. Although the text here is probably as clear as is practicable, it remains difficult to follow. A flow-chart, more user-friendly presentation, and further exposition of the implications would be helpful.

Special Sites and the Role of the Environment Agency. The Committee notes that a very great deal of information is likely to be required from local authorities by the Agency. The areas of chemical and radioactive contamination are likely to prove particularly difficult. It will be important that:

- i. the Department require clear performance data from the Agency and authorities;
- ii. the Agency's internal procedural guidance should be transparent and accessible to local authorities;
- iii. appropriate practical guides be available to assist practitioners;
- iv. the Memorandum of Understanding between the Agency and local authorities should play a central role and be regularly updated.

'Signing Off'. The Committee is concerned that this process appears somewhat vague, and the Agency and local authorities subject to inadequate pressures and time constraints. Scope for unnecessary delay must be minimised. A formal process should require that once the required steps have been taken signing off should directly follow. The Agency or local authority should be under an obligation to clear sites, and a degree of certainty in the

process is required. It should be sufficient that the Notice has been complied with. The process should be consistent with the Government's Enforcement Concordat for local authorities.

Guide Values and the CLEA Model. The Committee notes that guide values have been published for only some dozen of the contaminants, and in view of past delays, would wish to have confirmation when further guidance can be expected. The Committee notes that alternative models can be used, but sees merit in the use of only one. A transparent approach to availability of information and guidance on the CLEA Model is therefore important.

Training. In view of the complexity of the procedures, adequate training for local authority officers and other interested parties will be very important. It was understood that programmes were in preparation jointly by DETR, CIEH and LGA. However nothing appears to have been heard about this recently.

Resources. After the repeated delays and confusion in Contaminated Land policy in recent years, it is particularly important that the new regime now be efficiently established. The Department must recognise that adequate resourcing is an essential precondition for this.

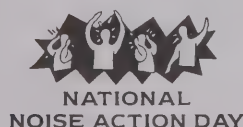
CLEANER TRANSPORT FORUM

The NSCA Cleaner Transport Forum was established in 1997 to bring together organisations with an interest in Transport and the Environment. It includes representatives from the oil and motor industries, local authorities, retail and distribution interests, environment and transport consultancies. Two major reports - on Cleaner Fuels and Low Emission Zones - have been published, with a Low Emission Zone Toolkit launched at the NEC on 10 November. A summary of the Toolkit can also be downloaded from the NSCA website: www.greenchannel.com/nsca.

The Forum is currently overseeing a second phase of co-operative research on the implementation of Low Emission

Zones. Other issues on its agenda include: dealing with older vehicles (retrofit and scrappage); transport noise mapping and links to air quality management; local authority purchasing of alternatively fuelled vehicles, and other cleaner fuels issues.

CTF is also running a seminar at the Royal Society of Arts in London on air quality and transport issues, on 10 March. The seminar will cover questions of national policy in the morning, with the afternoon devoted to more local issues - practicalities of LEZs, cleaner distribution, local transport plans, etc. More information from Tim Brown at NSCA: tbrown@nsca.org.uk.



NATIONAL NOISE ACTION DAY 2000

Wednesday 7th June 2000

NAD 1999 was a great success – upwards of 230 local authorities participated, we received national and local media coverage and Environment Minister Michael Meacher attended a central London event. This year we hope that there will be even wider participation. NSCA will be sending out an information pack, including ideas for and guidance on coordinating NAD, at the end of March. Our new noise teaching pack for secondary schools, Sounding Off, will be available for local authorities who want to promote noise issues in schools. We will also be carrying out our annual review of local authority implementation of and views on current legislation. DETR are employing a PR consultant, whom NSCA will be working with, to make sure NAD gets wider national coverage. NSCA work on NAD is supported by DETR.

For more information contact Mary Stevens, Email: mstevens@nsca.org.uk

Sustainable Development



NSCA INNOVATION IN SUSTAINABLE DEVELOPMENT AWARDS 1999

Sustainable development is rapidly becoming the central feature, not only of environmental policies but increasingly of economic and social policies also. In 1999, the Government published a strategy for sustainable development in the UK, *A Better Quality of Life*, which attempts to tie together social, environmental and economic considerations into a united framework. The promotion of sustainable development features among the statutory duties of the Environment Agency and the Regional Development Agencies and the Local Government Bill contains new and wide-ranging powers to promote the well-being of local authority areas. These powers will allow Councils to find and use innovative ways to meet their area's social, economic and environmental needs.

However, there is still much uncertainty about the practical application of sustainable development. While much useful work is being undertaken by local authorities, often within the framework of Local Agenda 21, we need a mechanism by which good ideas can be spread and built upon, in order to develop the best ways to implement sustainable development at the local level.

At the beginning of 1999, the Local Environment Management Forum, one of the policy groups of NSCA, decided to set up a scheme which recognised, valued and rewarded local authorities who have been innovative in this area. The scheme would focus on local authorities which

had approached opportunities for promoting sustainable development at local level in a positive and creative way. Many have already developed significant and innovative initiatives that need to be more widely promoted. The award scheme was intended to encourage public recognition of excellence in this field and to contribute to the process of developing and spreading good practice.

Sponsorship for the award scheme was obtained from UK-PIA and a panel of judges with considerable experience in sustainable development, LA 21 and environmental management assembled. There were over 100 expressions of interest from local authorities across the country, with 65 full entries in three categories. The awards were presented at the NSCA Annual Conference and Exhibition in Brighton by Lord Whitty, the Transport Minister, Christian Cleret, President of UK-PIA and Professor Walter Kofler of the International Hopes for the Future Scheme. The three winners will now go forward for the global Hopes for the Future Awards.

In this issue of Clean Air, there are articles by each of the category winners - Birmingham, Westminster and Sunderland, and each of the runners up - Angus, Luton and Powys. There is also a directory of the entries to the 1999 Awards with a brief description of their scheme. UK-PIA have kindly agreed to sponsor the Awards for a second year and we hope to have an even longer directory this time next year.

A COMMUNITY BASED INITIATIVE TO DEVELOP SUSTAINABILITY INDICATORS FOR BIRMINGHAM

Birmingham City Council

Winner of the NSCA centenary award for Innovation in Sustainable Development (category: Implementing Sustainable Development)

Background

Our inspiration arises from the 1992 United Nations Earth Summit on the Environment, which examined the future of our planet. The resultant Agenda 21 initiative encourages every local authority in the world to adopt sustainability indicators as objective measures of how each city, town or parish is moving towards or away from sustainability.

Whilst sustainability indicators are internationally recognised as essential, our problem was how to transform international

and global into relevant and local - how to involve the community in the generation and validation of the City's sustainability indicators, how to turn the 'Think Global Action Local' rhetoric into real "community initiative".

The City Council's Environmental Services Department, in partnership with the University of Birmingham, consulted thousands of citizens and group representatives, firstly to initiate a draft list of some 2000 sustainability indicators and finally, to whittle that list down to 22, each backed by supporting evidence and indicator trends.

The significance of this work is that the indicators subsequently adopted by the City are truly those chosen by our citizens and not, as in many other local authorities, imposed by Council officers.

The City Council launched the Environmental Forum Sub-Committee in 1992. The Environmental Forum was unique amongst UK local authorities as it ensured that decisions made with public participation were fed directly into the City Council policy making process. The Forum regularly attracts over 100 people to debate and guide City Policy and Strategy on environmental issues.

The Forum originated the process of developing indicators as an objective measure of how the City was moving towards, or away from sustainability. It took the view that such indicators could provide a comprehensive set of data to inform the City's decision-making, contribute to the self-regulation of sustainability and extend the process of ownership and responsibility into the wider community.

Preliminary Consultation

In developing our strategy it was clear from the outset that the team would need professional expertise to ensure statistical validation of the consultation process.

In conjunction with the University, we agreed that our starting point would be to draw people in from business and voluntary groups, and to use that cross-section of informed opinion to brainstorm a list of possible sustainability indicators. It was then our intention to rationalise this list through widespread community consultation and focus further effort on those areas with popular support.

As committed supporters of sustainability, we had our own ideas about those subject areas that we thought would readily lend themselves to meaningful indicators, such as the quality of air in the City. However, we were totally unprepared for the vast range of topics that would result from our first consultation exercise.

Twenty-three representatives from organisations ranging from the Friends of the Earth to the Birmingham Chamber of Commerce and Industry agreed to divide into three working groups, each focusing on identifying either environmental, economic or social sustainability indicators. At the conclusion of the exercise, the group had produced a list of some 200 possibilities ranging from the sperm count of Birmingham men to the number of square metres of "free meeting space".

Given the enormous range of possibilities, the team returned to these groups and asked them to assess each of the options based on the group's knowledge of:

- i whether the indicator was likely to be meaningful to the general public;
- ii whether it clearly demonstrated sustainability; for instance, under health, some diseases may be more related to genetic predisposition, than environmental, social or economic factors;
- iii the availability of monitoring information and any cost implications of gathering it;
- iv the frequency at which the indicator changed and could be measured (e.g. air quality can be measured every second whereas information concerning demographic change relies on the 10 yearly census);

- v whether further research would need to be commissioned for the indicators.

This process was significant in marginalising many of the less direct possibilities and thankfully resulted in a much shortened list of options.

The team subsequently returned to the Environmental Forum with the shortened draft list. Participants were presented with the overall picture and split into small groups to thoroughly discuss two or three of the draft indicators. In particular, the groups were asked to consider whether or not they thought that the indicator was 'understandable'; whether it had the potential to change a person's behaviour; and whether they felt strongly that the indicator should change.

Finally, an ancient but enjoyable system of voting was used to further narrow down the list of indicators. Each attendee was given five beans and asked to vote for their most popular indicator(s). By agreement, the team undertook to further develop and research all indicators receiving a total of 50 or more 'beans'. This left us with a draft list of 27 indicators.

We now had a list which was reasonably robust and had been considered by a large number of people; however most of them were committed environmentalists. What we wanted to know was whether the wider community would understand the indicators.

Public Consultation

We then carried out a community consultation exercise to bring clarity and verification to the set of sustainability indicators. Before the exercise was initiated, different frameworks for presenting the indicators were considered by drawing on previous research (McLaren). The framework favoured was to link the indicators to Birmingham's vision of creating a truly sustainable city by highlighting the interactions between the indicators that would contribute to a clearer picture of what sustainability meant.

This phase of the project involved conducting a series of focus groups with different sets of participants from the City. A list of potential focus groups was drawn up and a letter sent out to contact people describing the project and requesting their involvement in the consultation exercise. Twelve separate focus groups were assembled covering the full range of ethnic, socio-economic, cultural, religious and educational mix.

The twelve group sessions produced a mixed response – from indifference and confusion to enthusiastic support. Participants were asked to rate on a scale of 1 to 5 the ease of understanding of each of the indicators and the extent to which it was likely to contribute to increased sustainability. The participants were also asked to select up to three of the indicators and cite them in rank order as being the most important for developing a more sustainable society.

Results of Focus Group Sessions

The indicators most frequently cited as being one of the three most important were as shown in Table 1.

The responses in relation to each indicator in turn, in terms of 'understandability' and potential impact on sustainability are shown in Table 2.

The Bad News

The analysis of the focus groups' comments is given in the table and, unfortunately, is less than positive in that a significant number of the draft indicators were not widely understood and less than half of the participants recognised a link to the promotion of a more sustainable society.

General comments on the term "sustainability" ranged from "it's a cliché term" to "what does it mean?" As regards the draft indicators themselves, there was a general call for more facts and figures, comparative data, targets, explanations and background information. Clearly, the Team still had a lot of work to do before the indicators programme would be owned by the citizens of Birmingham.

The Launch

The launch of the final document took place on 2 April 1998. Speakers endorsing the indicators included Michael Lyons, Chief Executive of Birmingham City Council, who stated:

- "I am proud to say that these indicators are the result of a creative community dialogue about our common future, an approach in developing indicators which is unique in the UK and Europe."*

David Middleton, Chair of the Birmingham Environmental Business Club stated:

- "We need initiatives like the indicators to guide our vision. The indicators remind us of the inevitable tensions and conflicts that occur as we live our Western lifestyle. These indicators, chosen with the community, give some*

important messages about where we've been and where we might be going."

Councillor Margaret Wells, Chair of the Environmental Services Committee, perhaps best summed up this initiative in stating:

- "It is only now, having gone through the process, that we can see that the indicators a society chooses to measure itself by can be extremely powerful. They reflect collective values and inform collective decisions. We can find no other European city that has taken this route. It is fair to say that the idea of citizens choosing their own indicators is something new and exciting and something intensely democratic."*

In keeping with the spirit of the consultation and responding to the indicator selected concerning food miles, the buffet for the launch consisted of locally grown organic food. At the same time children also buried a time capsule in the local park containing items which we hoped would not be around in 50 years time, because of the damage they cause to the environment in their use or production, for instance ordinary light bulbs, virgin paper note pads, disposable nappies, disposable batteries.

The entire project, exclusive of officer time, cost £6,280, equating to 0.006 pence for each of our citizens.

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Table 1

Indicator	Number of times cited
Air Quality Indicators	34
Quantity of domestic waste recycled, against the quantity generated	24
Unemployment rate	14
The average number of miles that selected food items (e.g. apples and tomatoes) have travelled to reach a Birmingham plate	10
Number of privately owned and public sector houses with thermal rating at or greater a rating number yet to be decided upon	8
Open water of good quality	8
Quantity of land regenerated as a percentage of the total available	8

Table 2: Proportion of respondents agreeing or agreeing strongly with the statement:

Indicator	The indicator is easily understood	It will help to promote a more sustainable society
Quantity of land regenerated	20.0%	42.5%
Unemployment rate	55.0%	27.5%
Businesses with environmental management systems	22.5%	47.5%
Households with energy efficient light bulbs	82.5%	50.0%
Membership of Credit Unions	20.0%	22.5%
Membership of LETS	17.5%	17.5%
Members of Vegetable Box Schemes	15.0%	20.0%
Number of types of businesses	17.5%	35.0%

ECO RANGERS

Health and Housing Services
City of Sunderland

*Winner of the NSCA centenary award for Innovation in Sustainable Development
(category: Environmental Health and Sustainability)*

Background

The Department had successfully run an event called “Zone Rangers” in the City for four years. “Zone Rangers” is an accident prevention programme for primary school children targeting year 6 pupils aged 10/11 years. It takes place over two weeks each year, with pupils attending for a half day. Agencies such as Northern Electric, Tyne and Wear Fire Brigade and Northumbria Police are invited to “host a zone” within which they deliver their safety message in a visually stimulating and interactive way.

The impact of this form of education is demonstrated by the enthusiasm of participating pupils and teachers and the length of time the messages are retained. It was thought this method of education could be equally successful in delivering environmental messages.

A questionnaire was sent to all primary schools within the City to ascertain the interest in such an event. Over 40% of the schools replied, very enthusiastic and supportive. The schools thought it would be best to target Year 5 (9-10 year old) children and for the event to take place in the second half of the summer term after the SATs.

The idea of “Eco-Rangers” was born, however funding of the event had to be sought. An application for funding was made to the Northumbrian Water Environmental Trust (NWET) who are an independent non-profit making body which controls and administers a fund to be used for environmental projects. The source of the fund is credits from landfill tax which may be used as contributions to approved bodies to spend on environmental regeneration or the promotion of sustainable waste management.

The proposal submitted to NWET was to develop an innovative and unique project “Eco-Rangers”. A project to run for three years and designed to communicate environmental messages to school children through interactive events. It is intended as a regional and national pilot and the experience and expertise gained will be shared via conferences, good practice guides and promotion.

The application for funding was successful and the trust agreed to support the project to the amount of £45,315 over three years. This funding however had to be paid to an enrolled Environmental Body, and with which this Local Authority would enter into a partnership agreement. The organisation chosen to receive this funding was Durham Wildlife Trust, Rainton Meadows at East Rainton at which the Eco Ranger event was to be located.

The Initiative

A number of agencies/organisations were contacted to ascertain if they wanted to be involved in such an initiative.

The following agreed to host an environmental challenge for the children to attend:

Agency

City Contracting Services
Durham Wildlife Trust
Environment Agency
Tyne and Wear Fire Brigade
Durham Wastewise Project
Winsund
Children's Warehouse
Northumbrian Water

Subject Area

Reduce, Reuse and Recycle
Pond Life
Pollution
Chemical Contamination
Energy
Wind and Solar Energy
Recycling
Water Conservation

All primary schools were invited to attend the event which was arranged for the 8-15 June 1999. A total of 57 primary schools expressed an interest in participating in the event, but unfortunately this year the schools had to be chosen on a “first come first served basis”. The first 30 schools were booked in to attend with 1207 pupils.

Free transport was provided for the schools and the children arrived on site for 2¼ hours. They were divided into groups of between 10-15 pupils and circulated around each of the eight zones. Each agency then had twelve minutes within which to deliver their environmental message. The children attended a briefing and debriefing session before and after the event.

The Eco-Ranger character was present and the children could talk and exchange ideas with Eco-Ranger while they were on site.

Each agency submitted a quiz or article, which was collated and submitted into a children's workbook. This together with a certificate were distributed to each child at the end of the event and taken back to school to be used by teachers to reinforce the messages learned on site. Teachers were also given a resource pack with useful names and phone numbers for follow up work in school at a later date.

Evaluation forms on the event were sent to all participating schools and a post event report was completed and distributed to all the participating agencies. Of the 30 schools who took part 21 returned the evaluation forms giving a response rate of 70%.

All of the Zones were evaluated with the majority receiving a high percentage in the very good category. On the overall experience 76% thought it was very good and the comments included:

- * children enjoyed the visit and had plenty to discuss back at school
- * the children were kept active and involved a whistle stop experience
- * hope to be invited back
- * have to take part again.

Comments on the site included:

- * children moved around with ease
- * was surprised to see the facilities available
- * ideal location
- * need to be developed further has excellent potential.

Impacts of the Development

- * To raise environmental awareness amongst children of primary school age.
- * For children to receive environmental messages on more than one topic.
- * To reinforce these messages with workbooks which the children take back to school.
- * To provide teachers workbooks for them to tie in Environmental Education with the requirements of the National Curriculum.
- * For the children to learn about energy, recycling, conservation and take those messages home to other members of their family and the community. As children are part of the community and are the community of the future then it is important they learn as much as possible about their environment and the importance of saving energy, recycling etc., at an early age so it becomes second nature as opposed to making a special effort.
- * For the schools to take on board these messages and implement environmental auditing of the classroom, have recycling bins installed in the school grounds and to provide ideas to improve the school grounds.
- * To give them a taste of Environmental Education so they want more information and perhaps want to be involved in the Eco Schools award scheme.
- * The event attracted the attention of the local media and a number of articles appeared in the local press and featured on the local radio stations.

Development of the Scheme

The Eco-Ranger event this year was seen as a pilot scheme on which to build.

Following the results of the evaluation from the participating schools, the event will take place next year over two weeks 6 - 16 June inclusive to accommodate more schools and more pupils.

A conference on the event has been arranged for Wednesday 10 May 2000 to be held in Sunderland with a visit to The Eco-Rangers site at Durham Wildlife Trust, Rainton Meadows, East Rainton. The conference has been arranged to promote the initiative to other local authorities and as an example of Best Practice.

Funding of the event has been provided for three years, it is hoped by then the event will be well established in the schools curriculum and the schools themselves will take over the cost of the transport of the children.

Funding of the workbooks, badges etc. may be found from local organisations, companies who may wish to sponsor the event on a rotational basis.



Cllr Vin Bloxsome and the Mayor of Sunderland plant Sunderland's tree - their Innovation in Sustainable Development prize - with the help of the Eco-ranger and local children

WESTMINSTER CITY COUNCIL'S CLEAN AIR CAMPAIGN

Joy Thompson

Environment Policy Manager (Air Quality)
Westminster City Council

Winner of the NSCA centenary award for Innovation in Sustainable Development (category: Transport and Air Quality)

Westminster City Council's campaign to improve air quality is set within the framework of the following key facts:

1. Air quality in Westminster falls significantly below UK and EU standards in respect of nitrogen dioxide and particulate matter. The biggest contributor to emissions of these pollutants is road traffic:

- 96% of nitrogen dioxide emitted in central London is from vehicle exhausts;

- 94% of particulate matter emitted in central London is from vehicle exhausts (84% from diesel vehicles);

2. Transport in central London is constituted of vehicles which move goods and people and deliver services. All have a vital impact on London's and hence the UK economy.

3. Sustainable development meets economic, social and environmental needs in an integrated and balanced way. In central London the adverse impact of road traffic on air

quality is such that the needs of the environment are neither integrated nor balanced with economic or social needs.

Westminster City Council’s approach to tackling the problems of traffic emissions aims to develop sustainable patterns of transport and abate air pollution

Background

Westminster’s Clean Air Campaign commenced in the early 1990s and involves a range of projects to reduce vehicle emissions and to raise awareness of air pollution and its causes in Westminster.

In 1991 the City Council commissioned market research to establish residents’ key concerns relating to the quality of life in Westminster. Results showed that poor air quality was a major concern of residents. At the same time the City Council’s extensive air quality monitoring network showed that there were high levels of particulates (PM₁₀s) and nitrogen dioxide (NO₂) across Westminster. Working with colleagues in health authorities on the impact of these pollutants on human health the City Council became increasingly aware of their effect on the human respiratory and cardiovascular system. At the same time the information was coming through from research in the United States linking particulate matter with cancer. The link between increased levels of these pollutants and increased traffic volumes and the impact of diesel fuel in particular, was well established.

An early initiative in response to this knowledge, was to set up an exhaust watch scheme, whereby residents were encouraged to report smoky exhausts through completing a report card or phoning a hotline number. In 1993 the Council started voluntary roadside emissions testing and began an analysis of the central London vehicle fleet with a view to identifying ways to tackle the most polluting vehicles. Following this in February 1994 the City Council formally adopted a policy to reduce air pollution by:

- devising and implementing initiatives to encourage the development and use of cleaner fuels and technologies;
- conducting emissions testing;
- lobbying government to bring about legislative change and provide fiscal incentives;
- education and raising public awareness;
- recognition of good practice.

These aims were to be achieved through working in partnership with key players in the fuel and vehicle industries, fleet and public transport operators and Government.

PM₁₀s and NO₂ were the pollutants to be tackled and the key sources were diesel vehicles which were in the main, public transport, and commercial vehicles. The solutions available were, to reduce emissions from individual vehicles, or reduce traffic volumes, or both. The approach was qualified by a desire to avoid measures which would either adversely affect public transport, or damage the economy of central London. The emphasis of the campaign has therefore concentrated on reducing emissions, leaving the issue of traffic reduction to be dealt with via the pan London proposals being developed by the LPAC, and the Council’s Transport Policies and Programmes (now the Interim Transport Plan) which set long term traffic calming and reduction measures.

Features of the Campaign

The policy also aims to drive thinking about solutions to air pollution at a national level and, as a local authority, to lead by example. Consequently throughout the nineties the policy has developed and a wide range of initiatives have been launched which are shown in Table 1.

The Initiatives adopted are seen as the most effective way of achieving a policy objective at a point in time and in due course are reviewed to establish whether or not objectives are being achieved and if the initiative remains effective. For example the proposal for a low emission zone which is discussed below, aims to reduce the volume of vehicle

Table 1

<p>Promoting alternatives</p> <p>Reducing emissions from LT Buses City Council’s clean fleet vehicle strategy City Council’s cleansing contractors fleet strategy Reducing emissions from London taxis Greening the fleet seminars Developing a refuelling infrastructure for alternative fuels Free parking for electric vehicles Working with fuel industries on pilot projects to test out alternative fuels Purchase of a hydrogen fuel cell vehicle</p>	<p>Lobbying and raising awareness</p> <p>Lobbying Government for tax and duty reductions for clean fuels and technologies and for powers to test emissions Exhaust Watch Westminster 24 hour Air Quality Helpline and pollution warning system</p>
<p>Discouraging the use of unnecessary vehicles</p> <p>Walk to School Travelwise Car parking - taxing private non residential</p>	<p>Promoting low emissions/enforcing standards</p> <p>Emissions testing Green Pennant Low Emission Zone Coach strategy - switch off engines</p>

pollution occurring in central London. An alternative approach to that of denying access to the more polluting vehicles would be to reduce overall volumes of traffic in London. The percentage traffic reduction required to achieve any where close to National Air Quality Standards would be exceedingly difficult to achieve and have a major detrimental impact on London's economy. Also it would represent a diffuse, rather than a targeted solution to the problem.

Rather than describe each of the initiatives, the following highlights the features of selected initiatives which illustrate how the City Council has tackled emissions and developed original work and partnerships with others.

London Transport Buses and Westminster's Cleansing Contractor (Onyx UK Ltd.) – Ultra Low Sulphur Diesel and Exhaust Treatments

In the early to mid 1990s several oil companies began producing low sulphur diesel fuels claiming to reduce harmful emissions. The Swedish company Greenergy, keen to get a foothold in the UK market but without the garage forecourt infrastructure of the more established oil companies, approached the City Council and London Transport Buses with their product. It claimed to significantly reduce particulates from exhaust emissions. The City Council had already identified the need to reduce particulate matter and were impressed with the data backing the claims for this fuel. The Council were also keen to support LT Buses in their desire to clean up their fleet as the use of public transport is promoted in the Council's Transport Policies and Programmes (ITP). In 1995 a partnership project was set up with the City Council, Greenergy and London Transport Buses. The City Council sponsored tests on buses at Millbrook Proving Ground using a dynamometer set to a typical duty cycle of a London bus. Three different clean diesel fuels were tested and City Diesel yielded the best results, showing a reduction in particulates in the order of 40%. During the trial the partnership expanded to include the catalyst manufacturer Eminox. A particulate trap was developed specifically for the buses to reduce particulates even further - to 70%. During the trial and subsequent road tests a catalyst and trap were developed to overcome initial problems of the traps becoming clogged with carbon. These trials led to LT Buses adopting a policy to introduce ultra low sulphur diesel to all of their fleet over the next few years - both as a stipulation in new contracts and through renegotiating existing ones, and to fit catalysts and traps to all Routemasters (the oldest and dirtiest, but most popular buses).

In the same year, the City Council, in the process of renewing its Refuse Collection and Street Cleansing contract included a clause requiring the contractor to use City Diesel and have catalysts fitted to its vehicles. Again, Eminox were partners in developing a Continuously Regenerating Trap which would best suit the cleansing vehicles - there being none available off the shelf. More tests, funded by the City Council were conducted at Millbrook Proving Ground using a typical refuse collection

vehicle duty cycle. Results showed that the combined use of the clean diesel and exhaust technology could reduce particulate emissions by 88%. This enabled the City Council to claim the cleanest refuse collection vehicles in the world. A significant amount of publicity surrounded the findings of these tests and since that time many fleet operators have retrofitted catalysts and traps to diesel vehicles, and a major project in which the City Council is a key partner is now in progress to implement a similar programme with London taxis.

Benefits of the project are:

- Reduction in the emissions of particulates by 70% in buses and 88% in refuse vehicles.
- Reduction in particulates measured in Oxford Street (used almost uniquely by buses and taxis).
- Partnership with LT Buses helping to clean up the high profile and previously high polluting fleet.
- Partnership with Eminox enabling them to develop new technology subsequently applied to other national and international fleets.
- Lowest emission refuse collection vehicles in the world at the time.
- Demonstration of the benefits of City Diesel and catalyst technology to influence other operators to use them, and to influence Government to provide fiscal incentives for their use through reductions in tax and duty.

Westminster City Council Fleet Vehicle Strategy

In 1996 the City Council developed a strategy for its own leased vehicle fleet. The strategy was to ensure the City Council was using the cleanest vehicles within operational and economic constraints, to lead by example in encouraging the use of clean fuels and technologies, and to seek opportunities to support new, viable technology.

The key feature of the strategy was to remove or modify the use of diesel in the fleet and in particular to try to reduce the amounts of particulates and NOx it produced. The best data available at the time suggested that the options with the most to contribute to this aim were in descending order

- electric
- CNG
- LPG
- catalysed with petrol*
- ultra low sulphur diesel with particulate trap

*note that this option is specific to the urban environment where the need to reduce particulates outweighs the contribution petrol exhausts make to CO₂ levels.

The fleet was analysed, using annual mileage and fuel consumption data and applying standard emissions factor data (from ETSU). The quantity of PM₁₀ and NOx produced by each vehicle type, and hence for the whole fleet was calculated. This was a baseline against which future improvement could be measured. The next stage was to examine the available options for fuel conversion or vehicle

replacement, the costs of conversion and costs of replacement with a different type of vehicle (vehicles being replaced every five years under the leasing arrangements). This analysis provided the data to calculate how much pollution could be reduced per pound spent under each alternative fuel option.

The decision was to:

- Run all diesels on ultra low sulphur diesel;
- All diesels replaced in 5 years or fitted with catalysts and/or traps;
- Existing petrol vehicles replaced with LPG/CNG/electric alternatives as and when available;
- Set pollution targets to reduce particulate pollution by 95% and NOx by 15% over a 5 year period.

By summer 1999, in the fleet of just over 100 vehicles, the City Council had 15 LPG vehicles, 1 CNG transit van, 33 vehicles running on unleaded petrol (as an alternative to diesel) and fitted with catalysts, and the remaining fleet running on ultra low sulphur diesel with 38% of those fitted with CRTs or particulate traps. The PM₁₀ reduction is on target.

Having made decisions on wholesale change, attention turned to encouraging cutting edge technology through the purchase of a hydrogen fuel cell vehicle for working in the City Council's parks. This vehicle is only cost effective with the help of Powershift grant aid. However in addition to the benefits of a zero emission vehicle this project is primarily aimed at promoting hydrogen fuel cell technology, and is seen by the City Council as the way forward to deal with all the inherent operational difficulties with battery driven electric vehicles, notably battery recharging and hence range and battery size. The vehicle is a hybrid and has been designed and developed by ZEVCO in Belgium and is the first hydrogen fuel cell vehicle known to be purchased in world wide. It was delivered to the City Council in December 1999.

Benefits of the project are:

- Reduction of emissions of PM₁₀ and NOx from the Council's fleet.
- Promotion of clean fuels and technology - leading by example - now including clauses in tender documents to encourage contractors to use low emission fuels, and encouraged several other central London local authorities to adopt the same process.
- Demonstration of what can be done to reduce emissions in a strategic and cost effective way.
- Developing awareness of the benefits of hydrogen fuel cell technology and contributing to its research and development.

Emissions Testing

In 1993 the City Council began conducting voluntary roadside emissions testing of vehicles in partnership with the government Vehicle Inspectorate. The purpose of this

initiative was to raise awareness amongst drivers of the need to ensure that their vehicles perform to specification with regard to emissions at all times and that an annual check during the MoT test is no guarantee that emissions will remain within MoT standards for another 12 months. This was a voluntary arrangement with no enforcement powers. The City Council's view was that this initiative would be more effective if all local authorities were given powers to test vehicles and if drivers whose vehicles failed the test were fined. This would communicate the message that drivers should ensure their vehicles were properly maintained and within MoT standards all the time and not wait until they were "caught" before doing anything about it.

The City Council successfully lobbied for powers for local authority testing and a clause was included in Part IV of the *Environment Act 1995* giving the Secretary of State powers to make Regulations for local authorities to conduct emissions testing and to fine drivers of failing vehicles, and to request drivers to switch off their engines when parked. Local authorities would need to work in partnership with the Police as powers to stop vehicles would remain with them.

Before giving powers to all local authorities the Government passed Regulations in December 1997 for a pilot scheme to be run in seven local authorities across England, Wales and Scotland. Westminster was one of the pilot authorities. In January 1998 the City Council announced its intention to implement the scheme. Road side signs were erected on all major roads into the city and 100,000 leaflets were distributed. A trial ran for one month and at the end of February 1998 the City Council commenced fining drivers of failing vehicles £60.

Over 4,000 vehicles have been tested in Westminster. The testing strategy has been to test the proportion and types of vehicle which reflect the profile of the vehicle fleet in central London. This has not been easy to achieve as buses, coaches and taxis with passengers on board are not stopped. Within this framework the most visually polluting vehicles are targeted.

Drivers are allowed a 10% margin of error on the test. Outside of this, the failure rate has dropped from 9% in February 1998 to 3% at the end of 1999. Statistics bear out that the oldest vehicles are the most polluting ones. There are two possible explanations for the drop in the failure rate. One is that the message is getting across to drivers and they are keeping their vehicles properly maintained, the other is that drivers are avoiding the testing sites. Either way the message received is that highly polluting vehicles are not acceptable in Westminster.

For the City Council to run this initiative in isolation is not particularly effective in terms of impacting on the vehicle fleet. The pilot shows how effective it could be if all local authorities in central London were able to conduct emissions testing. The government reviewed the pilot at the end of 1998 and an announcement about the future of the scheme is long overdue at the time of writing. The City Council in the meantime continues to lobby for the powers to be extended to all local authorities.

Benefits of the project are:

- Raising awareness amongst drivers of the need to keep vehicles maintained in accordance with the manufacturers recommendations.
- Enforcing emissions standards.
- Reducing the number of highly polluting vehicles in Westminster.
- Encouraging the adoption of emissions testing by other local authorities to reduce pollution from gross polluters throughout London and other urban areas.

Green Pennant and Low Emission Zone

The Green Pennant scheme was developed and implemented by the City Council in 1997. It is an award in the form of a car sticker which recognises the efforts made by vehicle owners to reduce emissions from their vehicles. Qualifying criteria, in line with the City Council's own fleet vehicle strategy, are that a vehicle must run on gas or electricity, or on ultra low sulphur diesel and be fitted with a catalyst, or would normally run on diesel but uses petrol with a catalyst. This last criterion is related to air quality issues in central London as set out in the City Council's own fleet strategy. All vehicles need to be based in or operate in the Westminster area.

The scheme is simple and low cost. Applicants are required to complete a form and provide the vehicle registration document and any other necessary documentary evidence of the qualifying criteria, e.g. receipts to show that a catalyst has been fitted. A Pennant with the vehicle registration printed on it is then issued. The City Council is able to base its assessment of the reduction in emissions that qualifying vehicles are likely to achieve through the extensive research for its own fleet vehicle strategy described above.

To date close to 800 pennants have been awarded. Members of the scheme include large supermarkets, bus companies, major retailers, a major motoring organisation, an international haulage company and the Government Car and Despatch Agency.

The scheme was devised to promote clean fuels and recognise the efforts of those who use them and to identify and build a profile of the cleaner vehicles operating in Westminster. It was the first scheme of its type in the country and has proved extremely popular as fleet operators are keen to receive recognition of their environmental policies from the City Council. In 1997 a member of the scheme, the Centre West bus company operating buses for London Transport, offered the City Council free advertising of the Pennant by covering the entire exterior of one of their buses in Green Pennant logos. This facility has recently been extended to a long term basis. The award and promotion of the Green Pennant was a feature in Centre West Buses' success in winning a Government Clear Zone award in March 1999.

Although the Green Pennant scheme itself was aimed at

raising awareness and recognising good practice, it was always planned that this could be the first step in a much bigger project to identify clean vehicles and introduce vehicle restrictions in central London so that only vehicles displaying the Green Pennant or something similar would be allowed access. This has led to the development of the Low Emission Zone project.

At the end of 1997 the City Council approached Government Ministers with an outline proposal for a low emission zone. The City Council sought Government support for the concept, and joint funding for a feasibility study as the zone would extend beyond the City Council's boundaries and enforcement would be a matter for either the Government or a new London Mayor's Office. Ministers supported the concept and agreed to 50/50 funding for a consultancy study. Consultants were appointed in November 1998 to conduct a feasibility study into the implementation of a Low Emission Zone in central London.

A successful low emission zone will tackle the problem of pollution in terms of emissions from individual vehicles and reducing the volume of traffic. As stated earlier the economy of central London is highly dependant on mobility. The City Council views the restriction of traffic on the basis of emissions rather than traffic reduction as a more sustainable method of enforcement, because it will not in essence preclude anyone from driving into the area as it will be possible to acquire a vehicle which will qualify for entry. Issues which the study has considered are:

- The geographical extent of the zone e.g. central, inner or outer London;
- The main vehicle contributors to the pollutants PM₁₀ and NO_x - identifying which types of vehicle would be restricted;
- Criteria for entry into the zone - e.g. Euro 3 engine;
- Administrative and enforcement mechanisms;
- Potential impact on air quality;
- Costs of implementation and costs and practical consequences for vehicle operators, businesses and residents;
- Legal issues - would additional powers be required to implement a LEZ.

The zone would operate throughout the year but not necessarily on a 24 hour basis. The final report from consultants recommended a zone covering the whole of London, which would ban access to heavy goods vehicles which did not meet the Euro 3 standard - this can be achieved by a Euro 2 vehicle fitted with a particulate trap. The report also recommended that London local authorities work with London Transport Buses and the taxi industry to encourage compliance with the Euro 3 standard. Central to the proposal is that restrictions would apply to the most polluting vehicles and will not include cars, thereby not impacting on residents' mobility nor on people on low incomes. The study was based on the National Air Quality Standards existing at the time. During the course of the study the Government issued a revised National Air Quality Strategy for consultation, which included a weakening of the standard for PM₁₀. Further work is now under way to

assess how the proposed new standard would impact on the low emission zone in terms of its size and the criteria for restricted vehicles.

The City Council will be discussing the concept with other London boroughs and other key players such as London Transport early in 2000 with a view to completing the groundwork for a low emission zone in London, which will be ready for the new Mayor to pick up in July 2000.

The City Council considers that reducing air pollution in central London in this way represents more than a simple enforcement instrument - it actively promotes the use of alternative fuels and a more sustainable pattern of transport because access will only be denied to high emission vehicles.

Benefits of the project will be:

- Improvement in air quality in central London and possibly all of Greater London.
- Increase in the demand for clean fuels and vehicles;
- Wider national and international use of clean vehicles as commercial vehicles coming into the zone are likely to be travelling throughout the UK;
- Reduction of traffic volumes in London and therefore environmental improvement over and above those in air quality;

Greening the Fleet Vehicle Seminars

Since 1997 the City Council has held an annual seminar for fleet operators with the aim of providing practical information about the alternative fuels and vehicles available in the market, the costs and benefits of using them, where they can be purchased and what grant aid there is available. It has been the intention to provide useful information rather than lecture operators about their environmental responsibilities, but at the same time to keep them up to date with developments in legislation. The seminars have sought to provide pragmatic solutions to problems - always emphasising that there is no one perfect answer to the selection of clean fuels and that solutions must be tied in with what a business can reasonably do, and afford and meet the operational requirements of its vehicles. Speakers include manufacturers and traders in a wide range of alternative fuels and technologies, and fleet operators who have used them, so that delegates are given objective appraisals of the strengths and weaknesses of specific choices. In addition demonstration vehicles are always on show.

To date there have been three highly successful seminars. Delegate numbers in 1997, 1998 and 1999 were 80, 180 and 150 respectively. Questionnaires gave very positive feedback, indicating that the seminars provided very useful information and experience, and influenced operators to make changes to their fleets. Nineteen per cent in 1997, 15% in 1998 and 7% in 1999, said they would be making changes as a direct result of attending the seminars. In 2000 the City

Council will build on the benefits achieved through these seminars to develop a new format to communicate with fleet operators.

Benefits of the project are:

- Influencing fleet operators to change to cleaner fuels and technologies and raising awareness of what they can do to reduce pollution.
- Provision of all practical information to help fleet operators make good choices.
- Forum for fleet operators to share problems and experiences.
- Potential improvement in air quality following decisions of fleet operators to change to cleaner fuels.

Conclusions

The City Council's Clean Air Campaign was formally adopted in February 1994, although there were already pioneering initiatives underway with air quality monitoring, Exhaust Watch and emissions testing. The Campaign has developed during the 1990s with further ground breaking initiatives. Each initiative is part of an integrated and sustained approach by the City Council to improve air quality. Central to the strategy is the belief that no one measure will deal with the problems of central London's air pollution. Through these initiatives the City Council aims to pioneer new technology, lead by example, encourage key fleet operators to clean up their fleets, raise awareness, and reward and enforce good practice. They involve innovative thinking, identifying resources, and persistence to carry ideas forward. A great deal is achieved through working in partnership.

Since the policy framework was set for this Campaign in 1994 the previous Government introduced the National Air Quality Strategy and Local Air Quality Management. Westminster is at an advanced stage in implementing LAQM and declared the whole borough an Air Quality Management Area in March 1999. A local Air Quality Management Plan is now in draft. It will of course embrace all of the Clean Air Campaign - which will from June 2000 be known as Westminster's Air Quality Strategy and Plan.

The existence of the Clean Air Campaign has given the City Council a considerable advantage in adopting LAQM, and its original aims are at the heart of the National Air Quality Strategy, substantiating the City Council's forward thinking. However this does not mean that the City Council is complacent - Westminster still has the worst air pollution in the country and will be working in partnership with other London boroughs and key players to meet NAQS objectives.

Westminster City Council contact:
Joy Thompson, Environmental Policy Manager
(Air Quality) Tel: 0171 641 2236

RECYCLING IN ARBROATH

Angus Council

Runner up in NSCA centenary awards for Innovation in Sustainable Development

Brief Description of Project

This project involves New Deal trainees from the Environmental Task Force refurbishing bicycles recovered from the waste stream into useful vehicles. Recycling Operatives at the Council's five recycling centres recover unwanted cycles from the waste stream and lay them aside so that they can be uplifted by the New Deal Trainees.

The Council has recently received twelve of the refurbished bikes which the trainees have painted in the Council's colours. These cycles are to be made available for use by Council employees to travel between Council offices or on other official business.

Each bike will be fitted out with panniers, lights, locks, etc. and three bikes will be kept in secure cycle lockers outside each Council office building. Negotiations are underway with a local cycle retailer to provide this equipment at a discount to Council for bulk buying.

New cycle racks and lockers have recently been ordered and are to be fitted at the three main Council offices at County Buildings and St. James House in Forfar, and at Bruce House in Arbroath. Prospective users will register and obtain the key for the bike locker from the receptionist at each building who will also keep a record of use. This initiative is seen as an essential element in the Council's developing Green Transport Plan and a major launch of the scheme is planned to take place in the spring of 2000.

Consideration is also being given to the possibility of making the recycled bikes available to staff for home use in an effort to encourage staff to cycle to work. However, this idea is still very much in its infancy and will have to be weighed against other initiatives such as offering interest free loans for the purchase of cycles or negotiating discount deals with local cycle shops for purchasing new bikes.

Not only are adult bikes discarded into the waste stream, Council staff are amazed by the amount of children's cycles which are thrown away – probably as children outgrow them. Often, these children's cycles are in very good condition and just need a little touching up to bring them up like new. As there seems to be no demand for second-hand children's bicycles consideration had to be given to how to dispose of them. The Council, therefore, contacted Edinburgh Direct Aid (who are in partnership with the Scottish Charities Kosovo Appeal) and is now in the process of arranging for a shipment of children's bicycles to be sent out to Kosovo.

Several other children's bikes are to be given to local children of low-income families (through the Social Work Department) as Christmas gifts. Edinburgh Direct Aid has reciprocated by offering some toys in exchange for the recycled bikes, as they have no room to store the vast

quantity of toys that they have collected. The toys will also be distributed to local children in Angus.

Purpose and Origins

The main purpose of the scheme is to provide training for unemployed youngsters under the Government's New Deal, Environmental Task Force Scheme. In addition, under the Council's Environment Strategy, the scheme aims to meet the objective of encouraging waste minimisation and reuse (second life) of materials both within the Council and amongst the Community.

The trainees receive training in cycle repairs, maintenance and assembly and attend the local college on a day release basis. At college, trainees receive tuition in painting and this module can then be counted towards achieving an NVQ. Trainees can also undergo training in operating a forklift truck that leads to a recognised certificate giving trainees the qualification required to apply for employment as a forklift operator (three people have passed the course so far).

The project became operational in September 1998 and to date approximately twenty trainees have attended the course. The workshop is currently located in a garage within a Council Depot in Arbroath.

Key Features of the Project

Recycling Operatives at the Council's five recycling centres recover unwanted cycles from the waste stream and the operatives lay them aside so that they can be uplifted by the New Deal Trainees. The cycles are taken back to the workshop, and are then stripped, cleaned, reassembled, and painted by the trainees.

Trainees are given training in cycle repairs, maintenance and assembly and are taught how to paint the cycles.

Currently the scheme is financed through a partnership between the Council's Personnel Department, Environmental Health & Consumer Protection Department, and the Employment Services.

Impacts of the Project

For the Trainee:

- Provides training for long-term unemployed young people;
- Trainees gain modules towards achieving National Vocational Qualifications;
- Enhances trainees' future employment prospects;
- Trainees have gone onto future employment, further education and some are even thinking about setting up their own new business;
- Increases motivation and fosters a change in attitude amongst trainees;
- Gets trainees into the habit of good attendance and time-keeping;

- Gives trainees a purpose in life and a reason to get out of bed in the mornings;
- Fosters an interest in environmental issues;
- Appeals to people who prefer “hands-on” type of work.

For Sustainable Development:

- Reduces waste – closes the loop;
- Increases recycling, recovery and reuse (second life) of materials;
- Increases re-use of resources;
- Reduces resource and energy use;
- Helps to raise awareness of sustainability issues;
- Promotes Green Transport;
- Reduces pollution and congestion;
- Gives a boost to an economically deprived area;
- Provides for local needs;
- Demonstrates sustainability in a practical way.

Future Proposals

It is hoped that a move could be made in the near future to more suitable premises with a shopfront area in which to display finished cycles. Cycles could then be sold on at nominal price to socially deprived families.

In addition, the Council is about to move into other areas of commodity recovery, (e.g. furniture refurbishment) and manufacturing from waste (e.g. produce garden furniture from scrap timber). It is hoped that with a move to suitable premises, a full materials recycling facility (MRF) can be developed with facilities for baling plastics, cans and tin foil with a bulk deposition area for sorting and segregating of different materials.

Recent Developments

Sustainable Development is one of Angus Council “Key Themes” and has corporate priority status. Funding is made available for projects that encompass the Council’s key themes and priorities through a competitive bidding system – Policy Led Budget. The Environment and Consumer Protection Department made a successful bid under the Policy Led Budget system for a waste reduction project. It is hoped that some of this money could be used to finance

new premises for the New Deal Scheme. Investigations are underway to locate suitable premises that would allow for an expansion of the existing recycling facilities.

Conclusions

This scheme demonstrates a wise use of resources; cuts down on pollution by encouraging green transport; provides satisfying work and training thereby providing for local needs. The project also helps to increase knowledge and raise awareness of sustainability issues generally, as well as giving further benefits of better health and fitness for those who are encouraged to cycle instead of using a car for council business.

The scheme also demonstrates a contribution to the “Equity” side of Sustainable Development by shipping cycles out to a country such as “war-torn” Kosovo.

Participants are not only receiving training to help their future employment prospects, they are also realising the practicality of sustainable living which can then be translated into their everyday lives.

The local community is benefiting from the project in two ways:

- The creation of employment and training in an economically deprived area, and
- the recycling of discarded cycles being returned to the disadvantaged members of the community.

This scheme goes far beyond statutory requirements and exceeds current best practice. Not only are discarded cycles being refurbished and recycled thereby reducing waste and the use of virgin materials, embodied energy etc. but use is being made of the finished article with further knock-on benefits of promoting green transport.

Angus Council contacts:

Rosie Manson – Project Officer (Environmental Strategy); Morag Grant – Recycling Officer;
Tel: 01307 461 460.

AN INTERAGENCY APPROACH TO TACKLING FUEL POVERTY

A Part Of Luton’s Affordable Warmth Strategy

Luton Borough Council

Runner up in NSCA centenary awards for Innovation in Sustainable Development

Many of Luton’s most vulnerable citizens live in energy inefficient homes and suffer from both high fuel bills and cold homes. This strategy and interagency working was developed to try to find new and innovative ways of addressing the social and health problems caused by fuel poverty whilst increasing energy efficiency in the Borough to meet *Home Energy Conservation Act* (HECA) responsibilities.

It grew out of existing work being done by the Borough Council’s Environmental Health Service work in connection

with the HECA alongside the Council’s commitment to tackle both fuel poverty and social exclusion. The need to increase energy awareness within the local community and to increase uptake of energy efficiency grants and schemes fitted both agendas. The Council also has a strong record for partnership working, through Local Agenda 21. It was an efficient use of resources to pull together interested parties to achieve joint aims. The fact that Luton is one of the country’s first Health Action Zones made the initiative of particular interest to health professionals.

Development of Scheme

The strategy itself was developed in two workshops involving individuals and agencies known to have an interest in fuel poverty and energy issues. Participating organisations sought to maximise opportunities and to try to achieve added value to existing work. Challenging each other to try new ways of working resulted in some initial blockages being overcome.

There are many different challenges set within the strategy, but, partnership activity has focused around three areas:

1 Training

Six half day energy awareness training sessions were held in different locations across Luton. Over 100 participants took part, including representatives from council and health staff, voluntary groups and community members. This number has recently been extended to 165 and further training will be made available in February to meet demand.

Ten people, from the council, health trust and voluntary sector, have successfully completed City and Guilds Energy Awareness Training and passed the exam. These people are now equipped to help residents set heating controls etc in the course of their normal work. They also act as a first source of information amongst their colleagues.

Many people have indicated that the training has influenced their personal use of energy - an added bonus in terms of sustainability. In addition, they are more likely to influence others if they are committed to the energy efficiency ideal themselves.

Furthermore, we hope, that by offering training within the community to people with more than one community language, that potential language problems and cultural barriers will be overcome.

2 Information Dissemination

Participants at all levels of the process have been asked if their organisation has space available to display a poster containing current information on energy grants/schemes/discounts. Art and design students from a local college designed a poster border/branding for an 'Energy Matters in Luton' campaign. This information will be updated regularly through known contacts across town in an attempt to cascade information within the local community and ensure that local residents can take advantage of national and local grants, schemes and discounts available to them.

3 Referral Scheme

A multi-agency referral working group was developed to identify ways in which front-line staff, who come into contact with households or individuals experiencing fuel poverty, can refer to other appropriate agencies if the needs of the client are wider than their specific remit. Fuel poverty is usually the result of a number of inter-related difficulties which can be loosely identified around the following three areas:

- low incomes;
- high or unequal fuel prices;
- poor home energy efficiency.

This system enables colleagues (with a basic level of energy awareness) to be able to identify whether a client needs more information/assistance than they are able to offer from their particular service.

In consultation with the client, referring agencies are able to complete a simple form and return it to a central location in the Town Hall where information is processed and a referral sent to the appropriate agency.

The scheme aims to increase the uptake of the Home Energy Efficiency Scheme (HEES), a Government scheme offering energy efficiency grants to low income households. It is also possible to refer clients to check that they are receiving all benefits to which they are entitled and to various health support services.

In order to identify any shortcomings or potential difficulties, a pilot for this referral scheme was launched in October 1999 and will continue until the end of March. The Luton Against Poverty Forum is participating in this pilot as an identifiable body of local agencies for whom fuel poverty and affordable warmth is an important issue.

A referral form was devised by members of the group in consultation with Luton CAB; Rights TUC; The Health Trust; Luton Borough Council Staff.

Priorities for Housing Improvements

In a separate but related area of work, Luton's Health Action Zone has allocated a finite sum of funding to be used for small scale housing improvements to achieve maximum health gain. Health criteria for prioritising housing grant applicants according to health need have been agreed by the Environmental Health Service, Social Services and the health care trust. This will ensure that the funding is targeted appropriately.

Funding

The strategy was developed in partnership with NEA and with funding from Transco.

- HEES contractors have sponsored the printing of the referral form.
- Luton's Health Action Zone has sponsored further interagency energy training, hypothermia thermometers and the computer package.
- Poster borders were designed by Art and Design Students at Barnfield College in Luton.

Influence on Sustainable Development

- increases energy efficiency
- increases energy awareness in the community and in partner organisations
- environmental improvement
- increases health and well being
- increases the provision of warm safe housing
- builds effective partnerships
- increases skills/knowledge base in local community
- knock on effect to local energy related businesses
- knock on effect to local economy from lower fuel bills
- increased access to help and information by vulnerable groups
- builds on local strength and acknowledges cultural identity

Links to Other Strategies

The Affordable Warmth Strategy is a key part of the Council’s corporate Energy Strategy and Antipoverty strategy and the Health Action Zone work programme. It links with the Environment Strategy, Local Agenda 21 Action Plan. In addition to health and well-being benefits, there are expected economic spin-offs in terms of an increased skills base in the local community, lower fuel bills and opportunities for the energy related industries.

Management

Implementation and monitoring is overseen by a steering group comprising local authority and health authority representatives.

Evaluation

Effectiveness of interagency training is the subject of an environmental health student’s research project. Initial feedback from this has been positive.

Further evaluation will be by:

- numbers of referrals and appropriateness of these;
- monitoring effect on uptake of HEES grants;
- monitoring effect on benefit uptake;
- number of organisations displaying ‘Energy Matters in Luton’ poster.

At the end of 6 months, the scheme will be assessed and a detailed report prepared. In addition to the above, this report will include details such as: who is fuel poor, where they are, demographic details, types of advice being sought in terms of grants and benefits accessed, energy efficiency measures installed.

Replicability

The process could easily be replicated or adapted to suit needs in other areas. We have already responded to a significant number of requests for information on our experiences. Interdepartmental and interagency working is the key. To keep busy people from different agencies involved, the aims and activities must help to meet their targets as well as your own and must not significantly alter work loads.

It has also been suggested that the referral scheme could be replicated to address other cross agency issues.

Key Partners in Development and Implementation

- Luton Borough Council
 - Environmental Health Service
 - Social Inclusion Unit
 - Housing Services
 - Social Services
- Local Agencies included
 - health professionals
 - members of Luton Against Poverty Forum (including welfare rights and advice agencies)
 - tenants and residents representatives
 - local HEES installers

AND IT SEEMS TO BE WORKING!

At the time of writing, the referral scheme has been in operation for about a month. A number of successful referrals have been made and the scheme has already demonstrated the value of partnership working. Clients are accessing energy efficiency improvements, welfare benefits and health services that they otherwise might have missed. Most of these are in the private sector and are in the over 65 age bracket.

We hope that, if the pilot is successful, that this scheme could be replicated and serve as a useful tool to tackle fuel poverty from all angles and widen access under New HEES and HEES Plus.

We have 100 posters displaying energy efficiency information at approximately 80 venues. The number of calls we get about energy efficiency has greatly increased.

We can already see areas where the scheme will naturally expand as potential new partners are showing interest in becoming involved.

This is hard work but extremely rewarding.

Luton Borough Council contacts:

Environmental Services	
Heather Bruce	(01582 546115)
Social Inclusion Unit	
Sarah Allen	(01582 546979)

SUSTAINABILITY ACTIONS – RENEWABLE ENERGY

Powys County Council

Runner up in the NSCA centenary awards for Innovation in Sustainable Development

Powys County Council helped to initiate the Dyfi Eco Valley Partnership, which now includes Ceredigion and Gwynedd unitary authorities as well as various agencies, private companies, voluntary organisations and local individuals. It is a not-for-profit company limited by guarantee, which seeks to foster sustainable development within the Dyfi valley in Mid Wales. On the way, it hopes to discover what this might be! Its first focus is on the local energy economy.

Partnership

Discussions which led to the formation of the Partnership began at the end of 1996. The key players were the Environmental Policy Officer of Powys County Council and Dulas Ltd, a renewable energy company at Machynlleth. The Centre for Alternative Technology, which has had an “incubating” effect on related businesses in the area, was also soon involved.

The twin foci of discussions were:

- how to implement locally some of the concepts which CAT had been promoting and which Dulas had been delivering in various parts of the world;
- how to build on the existence of the “cluster” of renewable energy (and other environmental) companies and expertise in the valley.

A series of meetings gradually brought in more partners, notably the Development Board for Rural Wales (now part of the Welsh Development Agency), the other two unitary authorities operating in the Dyfi river catchment (Gwynedd and Ceredigion) and the Snowdonia National Park Authority.

Some of the partners who were on board by the end of 1997 had not worked together before. Some had been on opposite sides in public debates, particularly about wind power developments (e.g. Dulas Ltd and the Campaign for the Protection of Rural Wales). There was a common recognition of the desirability of inclusiveness when schemes were at the design stage.

Control has shifted away from the agencies towards local people since then – though some of these individual directors represent lines of communication to corporate bodies.

There is one staff member, who started work in June 1998. He is funded by the Community Renewable Energy Project – the Partnership’s only funded activity so far.

The Dyfi Valley

The project area closely approximates the catchment of the River Dyfi. There are some 5,000 households. Features of the area include:

- internationally important wildlife sites
- a strong history of using water power
- a cluster of renewable energy expertise and reputation
- two wind farms, which had become controversial for landscape reasons
- a tourism group called the Green Guide to the Dyfi Valley
- the UK’s first “green” light industrial park
- perceived remoteness from the centres of administration
- remnants of the slate quarrying industry
- over-dependence on the agricultural sector, including marginal hill farms
- a low-wage and under-skilled economy, with part-time and seasonal working giving an artificially-low official unemployment rate
- in-migration; causing some resentment from the established communities and disguising the continuing out-migration of younger local people.

This list illuminates the issues to be prioritised by the Partnership:

- how can sustainable development / Local Agenda 21 be defined and implemented in the Dyfi valley?

- how can the valley reduce its consumption of fossil fuels?
- are there models of renewable energy developments that would receive more solid popular support?
- can the local economy benefit more from local renewable energy developments and from its existing reputation and expertise?

Community Renewables

The partners wanted to establish a demonstration project for renewable energy developments at a community level. Finance for a three-year project was found from the structural funds of the European Regional Development Fund (for “5b” rural areas) and matched by local authorities, agencies, Dulas Ltd and the Shell Better Britain Campaign.

The EU funding gave the project the ability to grant-aid eligible schemes at a rate of 30% of capital costs. This was seen as crucial: very small schemes tend to be very marginal economically, with long pay-back times. Financial help is also given towards feasibility studies. The other factor which the Project offers (and which had also been seen as a real barrier to development) is staff time – landowners and community groups generally cannot carry out the necessary development work on their own.

The balance of capital costs for implementation of schemes comes from the private sector i.e. the local “developer”. Depending on the individual circumstances, this may be a farmer taking out a business loan and/or using the resources of the extended family, a business using its own reserves, or a community group selling shares to its members. This, then, does not use the model of inward investment which often characterises rural economies.

The Project has taken a community development approach, including linguistic sensitivity. Some local people have seen renewable energy as the preserve of the Centre for Alternative Technology (as promoters) and of part of the farming community (as landowners benefiting from wind farms). Since CAT is associated in some people’s minds with alternative lifestyles and social and economic change, it was important to involve these sceptical elements. A wide programme of visits to voluntary groups and Community Councils has been carried out.

Success

The project has succeeded in raising awareness of energy issues in the community and has got people thinking about how they can be involved. There is strong support for the community-based approach. Our database of local people is being used to bring new opportunities to the attention of those interested in specific aspects as they arise.

For example, we are seeking to match potential local investors with potential business schemes – a landowner may need a few partners to help develop a hydro scheme. More ambitiously, we are bringing together those who would like to jointly own a renewable energy development but who don’t own a suitable land resource. As a community-based company, they could collectively have a rental or lease agreement with a landowner.

The Partnership's Solar Club has helped five households to install their own solar water heating systems so far and trained a further four. The DIY approach, coupled with discounts from suppliers, roughly halves typical system costs.

We've learned that development costs are disproportionately large for schemes with such small income streams. Landowners/proposers find it difficult to risk money on feasibility work. It is also clear that long lead times are needed to cater for discussions with community groups and landowners, particularly where there are pre-existing and unrelated disagreements or issues of ownership.

Individual Schemes

Projects which have been promised grant aid include two schools installing solar electric systems with support from the Sclar consortium. A householder and a company are also being helped to install grid-linked "photovoltaic" systems; each of less than one kilowatt capacity. In addition, it is hoped that some bus shelters will be lit by solar / battery lights before too long.

Solar water heating in the non-domestic sector is represented by a Youth Hostel and by three commercial-size swimming pools.

Applications have been received for four "micro-hydro" schemes, which aim to sell a total of up to 250 kilowatts of electricity via the National Grid. In addition, three landowners hope to generate water power for their own use. A group of people hopes to organise a 30 kilowatt wind turbine.

It has been difficult to find ways to convert the large wood resource (particularly from forest residues and from small farm woodlands) into delivered heat at prices which compete with oil and gas. One farm and a pottery / smallholding are giving it a go and a furniture factory

intends to use its offcuts for space heating.

These projects will restrain climate change and acidification by displacing fossil fuels. They will reduce the amount of money which "leaks" from the local economy in fuel bills and strengthen local businesses - including those farm businesses which provide the backbone of society outside the town. They will also foster the kind of pride which comes when local people can say "we did that".

The Future

The Partnership is hoping that the Dyfi valley will be one of the "100 communities" aiming at 100% renewable energy supply which are suggested in the EU "Campaign for take-off" (of renewables). It already produces roughly the same amount of wind-generated electricity as it consumes, but this is only around 20% of the total energy usage. Making a dent in the heat market through expanding the use of woodfuel is a major target.

Adopting any such targets or aspirations, however, requires the Partnership to question its own credentials. To what extent can it speak for the wider local community on this? The formulation of a local energy policy calls for an interesting and challenging participation exercise.

The Partnership is planning other projects to complement and succeed the renewable energy one. The main candidates are the rational use of energy (where it has been frustrating not to have any grant aid capability) and waste management, particularly for putrescibles. Such projects should help the local authorities to deliver their responsibilities locally, including those under the Home Energy Conservation Act and waste reduction programmes.

Powys County Council contact
Andrew Bull, Head of Environmental Policy and
Minerals, County Hall, Llandrindod Wells LD1 5LG

Projects Entered for 1999 Innovation in Sustainable Development Awards

Local Authority	Contact	Project	Description
Angus Council	Rosie Manson, Projects Officer, Environmental Strategy	New Deal Recycling Project	A scheme for recycling bicycles
Bexley C	Ben Thomas, Senior Planner	BICC General SRB Partnership	Redevelopment of brownfield site to provide parking and a wildlife lake
Birmingham CC	Jane Forshaw, Team Leader Environmental Strategy	A Community Based Initiative to Develop Sustainability Indicators for Birmingham	Producing indicators through public consultation
Bracknell Forest BC	John Osborne, Director of Public Environmental Services	Local Environment Strategy	Developing systems to promote local sustainability both internally and externally
Braintree DC	Roger Barrett, Corporate Director	The Braintree District Quality of Life Plan 1999	Implementing Agenda 21 through partnership
Brighton and Hove DC	Daniel Brace, Environmental Co-ordinator	Sustainable Development the Brighton and Hove Way	Developing Agenda 21 through public education and consultation
Broxtowe BC	Fergus Bazel, Environmental Liaison Assistant	Implementing Corporate Sustainable Development	Implementing Agenda 21 with internal and external consultation
Bury MBC	Mr C Worth, Principal EHO	Eco Warriors go to school	A resource package to help children appreciate the importance of our environment
Cardiff CC	Su Mably, Health Strategy Manager	Local Environmental Health Action Plan	The Development of a local environmental health action plan for Cardiff
Caerphilly CBC	Jeanie Gray, Local Agenda 21 Co-ordinator	Implementing Sustainable Development	Co-ordinating implementation of sustainable development through existing council structures
Carlisle CC	RWS Speirs, Head of Environmental Services	Centre Forty Seven Kerbside Recycling Project	Partnership project for recycling
Carlisle CC	Jo Shepherd, Principal EHO	The Brampton House Eco Project	Sustainable Housing Design and Maintenance
Colchester BC	Andrew Budd, Transportation Officer	Future Moves	A Consultation on transport strategy beyond 2000
Cotswold DC	Natasha Poole, Environmental Co-ordinator	Integrating Sustainable Development into Everyday Activities	Integrating sustainable development into the day to day working of a local authority

Local Authority	Contact	Project	Description
Crawley BC	Simon Mills, Environmental Co-ordinator	The Green Business Network	Involving business in the LA21 process
Crewe and Nantwich BC	Phil Riding, LA21 Coordinator	Local Agenda 21	LA21 Forums
Derbyshire Dales DC	Peter Corke, LA 21 Co-ordinator	Ashbourne Multi-Agency Group	Involving local stakeholders in promoting LA21 issues
Down DC	Margaret Quinn, Project Officer	Newcastle 2000	Using a voluntary group of local people to establish partnerships for sustainable economic and social regeneration
Durham CC	Fraser Davie, Press Officer	Wind Turbine Generator	Installation of a wind turbine to provide electricity needs, and as an educational tool at Cassop Primary School
Forest of Dean DC	Jim Stewart, Director of Planning and Leisure	A Guide for Sustainable Housing Development in the Forest of Dean	Production of a residential design guide incorporating principals of sustainability, with a view to producing housing reflecting local distinctiveness and based on sustainable principles
Guildford BC	Clifford Bell, Chief EHO	An Integrated Response to Air Quality and Transport Issues	Investigation of public perception of air pollution and transport in Guildford
Hyndburn BC	Mark Hopley, Local Agenda 21 Co-ordinator	Sustainability Action Plan	The initiation and facilitation of a community owned Sustainability Action Plan
Kent County Council	Theresa Trussell, Kent Design Working Group	Kent Design Initiative	Producing a design guide for Kent incorporating public consultation and sustainable principles
Kings Lynn and W Norfolk BC	Steve Jenkins, Environmental Promotions Officer	20/20 Vision Consultation Process	Using wide public consultation to develop a vision around which a strategy, action plan and sustainable indicators can be developed
Leicester CC	Nick Hodges, Special Projects Officer	Sustainable Transport and Air Quality	Sustainable traffic demand management
Leicester CC	Howard Thomas, Environmental Promotions Officer	The Belgrave Corridor Project	Managing city traffic
Lewes DC	Trevor Watson, Sustainable Development Officer	A Process for Building a Sustainable Neighbourhood: Barcombe Parish LA21	Establishing neighbourhood LA21 in a rural area
Luton BC	Heather Bruce,	Interagency approach to tackling fuel poverty	Addressing social and health problems caused by fuel poverty

Local Authority	Contact	Project	Description
Medway C	Sandra Woodfall, LA21 Officer	Local Agenda 21 in Medway	Community and council initiatives in sustainable development
Middlesbrough Council	Jeff Duffield, Group Leader, Environmental Health	Sustainability in Middlesbrough	Using community visioning and community engagement to support LA21 and an environmental sustainability strategy
North Lanarkshire C	Alan Hendry, Senior Planning Officer	Corporate Energy Awareness Training	To raise awareness of energy consumption in relation to CO2 emissions and improve workplace energy efficiency
North Lanarkshire C	Alan Hendry, Senior Planning Officer	Staff Sustainability Prize	Encouraging staff to relate sustainability to everyday working practice
North Lanarkshire C	Alan Hendry, Senior Planning Officer	Safer Routes to Schools	Strategy to reduce road accidents and achieve a modal shift in transport
Newark and Sherwood DC	Robert Bennington, Environmental Co-ordinator	Integrating Sustainability into the Best Value Regime	Linking local sustainable development indicators with the Best Value process to provide good value and sustainable service
Norwich CC	David Ellis, Head of Environmental Strategy	A distinctive approach to LA21	Developing LA21 through community partnerships, community power and corporate planning
Pembrokeshire CC	Mrs Clare Williams, Environmental Co-ordinator	Greenhill School Tenby, Environmental Project	Integrating environmental and energy saving measures into school building design
Pendle BC	Jane Wright, Policy Officer	Honest Broker Scheme	Using 'honest brokers' to offer confidential and impartial advice to local businesses on pollution issues subject to regulation by the council
Powys CC	Andrew Bull, Head of Environmental Policy and Minerals	Dyfi Valley Eco Partnership	Community owned, small scale renewable energy projects
Powys CC	Richard Pitts, Local Futures Officer	The PULSE Project	Project for understanding local sustainability through education - enabling primary school pupils to adopt and monitor a local habitat.
Renfrewshire C	Janet Brooke, Development Manager	Delivering on Agenda 21 - The Sustainable Communities Route	A practical community development approach to sustainability.

Local Authority	Contact	Project	Description
Richmond u Thames LB	Sue Duckworth, Recycling and Environmental Manager	Sustainable Development in Richmond	Programme of sustainable development encompassing environment, equality and economy
Rushcliffe BC	Peter Strutton, Energy Efficiency Officer	Rushcliffe-Eco Team Programme	A programme aimed at achieving behavioural change in the consumer
City of Salford	Gerard Steadman, Environmental Officer	Greater Manchester Air Quality Strategy	Co-ordinated approach to air quality
City of Salford	Chris Lingard, Business Service Manager	Scrutiny Commission	Development and implementation of a consultation process to involve the community in policy formulation for environmental services
Sandwell MBC	Janet Lock, Senior Planning Officer	Cycling in Sandwell - the strategy	Developing cycling as an alternative transport mode
Sefton MBC	Ruth Stronge, Local LA21 Co-ordinator	Air Quality Information System	Providing the Public with Advice and Information
Shepway DC	Ian Russell, Executive Director	The Development of a Community Plan for Sustainability Issues in Shepway	Engaging the community in developing a sustainability plan
S Lanarkshire C	Kenny Boag, Environmental Policy and Waste Strategy Manager	Integrating Sustainable Development in South Lanarkshire	Integrating sustainable development with a common local agenda for public and partner organisations.
Stockport MBC	Darren Pegram, Sustainable Policy Manager	Stockport Healthy Transport Alliance	A partnership between local authority, health services and educational institution aimed at the development and implementation of green transport plans.
Stratford upon Avon DC	Frances Robertson, Environmental Co-ordinator	Sustainability Checklist for Committee Reports	A mechanism for assessing the sustainability of all new initiatives and policies
Stroud DC	Kaye Welfare, Energy Efficiency Officer	The Riverside Energy Project	Introducing energy efficiency to low income households in rural areas
Suffolk DC	Peter Knight, Research Officer	The Energy Education Resource Pack	Development of an educational resource on energy efficiency at local and national level.
Sunderland	Susan Goodchild, Senior EHO	Eco Rangers	Environmental education for school children

Local Authority	Contact	Project	Description
Surrey CC	Rachel Millichap, Environmental Programmes Project Officer	The Sustainable Surrey Programme	Involving stakeholders and securing commitment to sustainable development
Surrey Heath BC	Ken Stewart, Chief EHO	Compressed Natural Gas Vehicles Initiative in Action	Promoting the use of alternative cleaner fuels
Sutton LB	Graham Dean, LA21 Co-ordinator	Sustainable patterns of transport	Switching to low emission vehicles
Walsall MBC	Helen Barrow, Project Development Officer	Walsall's Windows on our world	Involving school children on Walsall's environment and heritage at the millenium
Wandsworth BC	M Wilkinson, Chief Parks Officer	London Lakes Rehabilitation Project	Rehabilitation of three London lakes, development of land use management model and engaging the public in maintenance of standards
Warwick DC	Chris Elliot, Commissioning Director	Action 21	Involving the community in achieving sustainable development
Warwick DC	Chris Elliot, Commissioning Director	A Transport Plan	Tackling problems of increasing road traffic
Westminster CC	Joy Thompson, Environment Policy Manager	Westminster Clean Air Campaign	Reducing city air pollution
Winchester CC	David Walker, Planning Officer	Future of Winchester Study	Engaging stakeholders in assessing the future of a historic city in a social, economic and environmental context
Winchester CC	Robert Heathcock, Senior Environmental Health Manager	A Green Fleet Award Scheme	Encouraging fleet operators to improve air quality
Wolverhampton MBC	A Hilton, Environmental Awareness and Sustainability Officer	Kingswood Infant and Nursery School	To enable young children from largely urban areas to experience and enjoy a rural environment and develop personal and social skills
Wolverhampton MBC	A Hilton, Environmental Awareness and Sustainability Officer	Green and Kickin'	Engaging young people in the Agenda 21 process

UPDATE

Quality of life Counts

"Achieving sustainable development is one of the greatest challenges facing the world today", said Environment Minister Michael Meacher when, on 8 December, he launched the most far-reaching set of indicators published by any country. Sustainable development is about ensuring a better quality of life for everyone, now and for generations to come. It means a more inclusive society in which the benefits of increased economic prosperity are widely shared, with less pollution and less wasteful use of natural resources.

The new report, *Quality of life counts*¹, follows the publication in May 1999 of *A better quality of life: a strategy for sustainable development for the UK*². It includes some 150 indicators, covering the social, economic and environmental dimensions of sustainable development. The report provides a benchmark against which future progress can be measured.

In the future, the government proposes to bring together and publish the latest information about progress against each of 15 'headline' indicators once a year. It will account for the action it has taken, and proposes to take, in priority areas. The headline indicators are intended to give a broad overview and to raise public awareness. The headline indicator for air quality is the number of days when air pollution is moderate or higher. In urban areas the average number of days per site when air pollution was recorded as moderate or higher fell from 60 days in 1993 to 25 days in 1998.

A further 130 or so more detailed indicators focus on specific issues and are more closely linked to actions which people - government, businesses and individuals - need to take. In addition to the air quality headline, there are indicators covering concentrations³ and emissions of selected air pollutants, and acidification. There are also many indicators on related issues: for example, respiratory illness, generation and use of energy, and transport.

The report includes, for each indicator, a "traffic lights" assessment of whether it is moving in a direction consistent with the objectives in the sustainable development strategy. It also includes some cross-cutting analyses which examine the links between growth and environmental impacts for households, industry, services, energy and transport. The analyses help to illustrate some of the major challenges that lie ahead.

The report says, "In the past, focus has centred mainly on improving labour productivity. In the future, greater emphasis will be needed on resource efficiency. We need to break the link between continued economic growth and increasing use of resources and environmental impacts."

¹ *Quality of life counts: Indicators for a strategy for sustainable development for the United Kingdom*. DETR, London (ISBN 1 85112 3431). Available priced £22 from DETR Publication Sales Centre, Unit 121, Goldthorpe Industrial Estate, Goldthorpe, Rotherham S63 9BL. Tel: 01709 891 318 Fax: 01709 881 673

Also available on the DETR website: www.environment.detr.gov.uk/sustainable/index.htm

² *A better quality of life - a strategy for sustainable development for the UK*. DETR (May 1999). TSO, London (Command number 4345)

³ *Indicators for Air Quality and Sustainable Development: Dorothy Salathiel and Aggregated UK Air Pollution indicators*, Greg Archer and Victoria Sykes. Clean Air, Volume 28, No 5.

Environment Agency

Sir John Harman, formerly Deputy Chairman, has been appointed Chairman of the Environment Agency, taking over from Lord de Ramsay on 1 January. Sir John, has been a member of the Environment Agency since 1995; he is also a member of the Government's UK New Deal Task Force, a member of the UK Round Table on Sustainable Development and of the Energy Savings Trust.

Environment Minister, Michael Meacher, has announced that the Environment Agency is to receive a £2 million increase in its grant, bringing its total grant from DETR to £100 million for 2000/01. The additional grant is to help the Agency take forward work in a number of areas, in particular:

- Preventing the pollution of groundwater;
- Providing advice to farmers about the disposal and control of agricultural waste;
- Helping industry prepare for the introduction of IPPC.

Childhood Cancer and Power Lines

The National Radiological Protection Board's Advisory Group on Non-Ionising Radiation is to investigate recent claims that a causal link between power lines and human health can be established.

Research by scientists at Bristol University reported observations of increased deposition of natural radionuclides on plastic materials placed in the vicinity of power lines. From the measurements, it was inferred that other pollutants in the environment, such as car exhaust fumes, will behave similarly and this may be the cause of childhood leukaemia. These claims are to be compared with the findings of the first paper from the UK Childhood Cancer Study which shows no increased risk of childhood cancer associated with magnetic fields from the electricity supply.

New Air Pollution Protocol

The UK has signed the latest protocol to be agreed under the UN ECE's Convention on Long-Range Transboundary Air Pollution. The new multi-pollutants protocol - covering nitrogen oxides, sulphur dioxide, VOCs and ammonia - aims to reduce acidification, eutrophication and tropospheric ozone. Parties to the protocol have agreed national emissions ceilings for each of the pollutants to be achieved by the end of 2010. For the UK the ceilings are as follows:

- Sulphur dioxide – 625 kilotonnes/year
- Nitrogen oxides – 1181 kilotonnes/year
- VOCs – 1200 kilotonnes/year
- Ammonia – 297 kilotonnes/year

Monitoring for Health Impact Assessment

Health impact assessment combines estimates of population exposure with information on toxicity; however, most air quality monitoring systems do not fully address population exposure to toxic air pollution. Given the importance of the availability of valid information on population exposure to air pollutants, the WHO European Centre for Environmental Health organised a working group to define the features of monitoring networks that

allow their use in assessing the potential exposure of the population to air pollutants from ambient air. The principles outlined in this new book from the WHO – *Monitoring Ambient Air Quality for Health Impact Assessment** – are intended to promote progressive modification of the networks monitoring air quality to improve their usefulness for health impact assessment.

* WHO Regional Office for Europe, Copenhagen, 1999. ISBN 92 890 1351 6. US\$55.80.

EC Environmental Law

Formerly called *EC Treaty and Environmental Law**, this is the fourth edition of Professor Ludwig Kramer's book, and includes developments in community legislation to 30 June 1999. Objectives, principles and conditions of Community environmental law are outlined, together with the decision making process and the powers of the Community and Member States. Later chapters summarise Community policy and law in the fields of, inter alia, waste management, air pollution, and water protection, outlining the main regulatory measures and other developments. Cross-sectoral issues, such as IPPC, accident prevention and access to information are also covered.

* Sweet & Maxwell, London, 2000. ISBN 0 421 590203. £55.

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MEMBERS NEWS

Members! Are we covering your news? Please check that your press office has Clean Air on its mailing list - or send your news direct to <tbrown@nsca.org.uk>.

Many NSCA member organisations (including **BP, Ford, Safeway** and **Vauxhall**, with **Birmingham, Canterbury** and **Glasgow City Councils**) participated in the recent SMMT Stop Fuming Campaign. In 4,000 voluntary car emission checks, an average of 14% of vehicles failed to meet their emission standard. Older vehicles tended to have a higher failure rate, whilst regular servicing improved emissions performance overall. Our photo shows one of the emission checks under way. More on <www.stopfuming.co.uk>.



Greenenergy has appointed Dr Richard Tipper as Managing Director of Greenenergy Carbon Partners, which aims to inform and advise business on risk management in the face of an economic value being put to carbon dioxide emissions@. More on <www.greenenergy.com>.

Shell has launched LPG Motorgas in Scotland at **Edinburgh City Council's** Festival of the Environment. There are now filling points in Edinburgh, Dundee, Glasgow and Aberdeen, with dozens more planned. Shell say LPG could make a significant contribution to improving air quality in urban areas throughout Scotland. They also point out that LPG is a truly Scottish fuel, originating as propane gas from the Brent oilfield, where it is piped to gas plant in Aberdeenshire and then on to Fife, where it is turned into Motorgas. More on <www.shell.com>.

Meanwhile **Sainsbury's** is opening three LPG outlets at supermarkets in London. The new brand AutoGas is supplied by British Gas LP Gas; Sainsbury's expect to make the fuel available more widely following the trial.

The **Met Office's** NAME system was originally developed to plot nuclear emissions following the Chernobyl accident. Now it is being launched as a model to forecast the dispersion of a range of transboundary pollutants, depending upon different weather patterns (see photo). The Met Office plans to host a seminar for local authorities to introduce the new service. Contact Karl Kitchen: 01344 854455.



Divisional News

The **South East Division** is planning a conference in May on Air Quality Management in London. This will be held in conjunction with the London air quality cluster groups, the Association of London Environmental Health Managers, and University College.

In November 52 members of the **East Midlands Division** met at the Bass Brewery in Burton on Trent. Clive Austin, the Environmental Project Manager gave a presentation on the company's experience with environmental standard ISO14001, and detailed progress in waste reduction, energy conservation and recycling. Duncan Mounsor from Enviro Technology gave a talk on air quality monitoring, including open path systems.

Meanwhile, the Divisional programme is shaping up for 2000, with meetings on GMOs at Monsanto in Cambridge on 17 February and a seminar on noise related issues in March or April, in Chesterfield. The AGM on 29 June at Ashfield DC incorporates possible visits to Rolls Royce Aeroengines and the Kodak film processing plant.

FUTURE EVENTS

20-22 MARCH – Industrial Air Pollution Monitoring

Short course and exhibition.

Venue: Weetwood Hall Hotel & Conference Centre, Leeds.

Details: Jenny Bannister, School of Process, Environmental & Materials Engineering, University of Leeds,
Tel: 0113 233 2494;
Email: m.j.bannister@leeds.ac.uk

27 MARCH – Monitoring and Abating VOC Emissions

Update on new EN standards for measuring VOCs, best practice in solvent management; monitoring – where are we; emission reduction by process change; application and evaluation of end of pipe abatement options.

Venue: Novotel Birmingham

Details: Penny Richards, IBC Global Conferences Ltd,
Tel: 020 7453 5496;
Email: cust.serv@ibcuk.co.uk;
website: www.ibc-uk.com/kc109

6 APRIL – Accident Investigation

One day course which seeks to explain and illustrate the legal requirements for accident reporting and investigation; methods of analysis and presenting accident data; investigation techniques and the role of physical, management and behavioural controls in accident prevention.

Venue: Loughborough University

Details: Joyce Bostock, Centre for Hazard & Risk Management, Loughborough University,
Tel: 01509 222175.
Email: J.G.Bostock@lboro.ac.uk

11-14 SEPTEMBER – Environmental Impact Assessment

12th IUAPPA Regional Conference, and 4th International Conference on EIA; it will focus on contemporary issues in the field of EIA, environmental protection, and conceptual and legislative issues reflecting international cooperation, especially related to the EU. Czech, English, Slovak simultaneous translation.

Venue: Prague, Czech Republic.

Details: J.E. Purkyne, Czech Medical Association, PO Box 88, Sokolská 31, 120 26 Prague 2;
Fax: +420-2-294610, 2421 6836;
Email: senderova@cls.cz

26-30 NOVEMBER – Environmental Management and Clean Air

14th IUAPPA Regional Conference being held in Peru and jointly organised by the Peruvian Society for Clean Air and Environmental Management and the Institute of Ecological Feasibility Studies (IDEFE). The conference will provide an international forum for not only identifying air pollution problems in the Andean Region, but more importantly to discuss current

research and look for appropriate solutions.

Venue: Marriott Hotel, Miraflores, Lima, Peru.

Details: Maria, Ines Bello, General Manager, MIBA Event Coordinators, Pasaje San Martin, 142 Oficina: 303, Lima 18, Peru.
Fax: (51-1) 447 1541;
Email: MIBA@lared.net.pe

CALL FOR PAPERS

26-31 AUGUST 2001 – 12th World Clean Air & Environment Congress

“Greening the New Millennium” is the theme of the 12th IUAPPA World Clean Air Congress, which takes place in Seoul and is being hosted by the Korea Society for Atmospheric Environment. The Congress will encourage discussion on the latest research in measurement, modelling and management of air pollution, and includes sessions on all aspects of air pollution policy, air quality management, waste management, vehicle emissions, sustainable development, and many more. The deadline for submission of abstracts is 25 November 2000. For a copy of the first announcement contact Loveday Murley at the IUAPPA Secretariat on Tel: 01272 326313 or Email: lmurley@nsca.org.uk, or iuappa@nsca.org.uk



2000

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Air Quality Management Areas: Turning Reviews into Action

NSCA's definitive guide for local authorities and consultants on the declaration of AQMAs is now available, helping to unravel the complexities of:

- Modelling uncertainties
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The guide has been written by NSCA's Air Quality Committee and represents the consensus view of some of the UK's top air quality experts. It is **free** to NSCA members and £5.00 per copy to non-members.

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clean air *and environmental protection*

May/June 2000

the bi-monthly journal of the National Society for Clean Air and Environmental Protection vol.30 no.3

- *Major Stationary Sources & the AQ Strategy*
- *Secondary Air Pollutants*
- *Calculating Short Period Concentration Statistics*
- *Priority Pollutants in Renfrewshire*

nscA



National Society for Clean Air and
Environmental Protection

Two noise leaflets launched

In conjunction with **National Noise Action Day** on **Wednesday 7 June**, the Society has revised and redesigned its two noise leaflets.

NEIGHBOUR NOISE

6 page DL leaflet outlining the problems and explaining the courses of action open to aggrieved neighbours.

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This is the first of two books from the Environmental Analysis Co-operative (EAC), a group of about 50 organisations including the UK Environmental Agencies. Both are edited by Rod Perriman, formerly Her Majesty's Chief Inspector of Pollution and later in corporate environmental management with ICI and Zeneca.

The guide explains how managers of projects large and small can integrate planning with pollution control in their project development programmes.

£14.99, 1999/40 pages/A4 softback/ISBN 0 85295 422 0

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The guide provides a framework for environmental assessment in the context of an IPC or IPPC application.

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The National Society for Clean Air and Environmental Protection produces information, organises conferences and training events, and campaigns on air pollution, noise and environmental protection issues. Founded in 1899, the Society's work on smoke control led to the Clean Air Acts. More recently NSCA has been influential in developing thinking on integrated pollution control, noise legislation, and air quality management.

NSCA's membership is largely made up of organisations with a direct involvement in environmental protection: industry, local authorities, universities and colleges, professional institutions, environmental consultancies and regulatory agencies. Individual membership is also available to environmental specialists within industry, local authorities, central government, technical, academic and institutional bodies.

Members benefit from joining a unique network of individuals who share an interest in a realistic approach to environmental protection policy; from access to up-to-date and relevant information; from reduced fees at NSCA conferences and training events. They contribute to NSCA's regional and national activities; to environmental policy development; to translating policy into practice; to the Society's wide-ranging educational programmes.

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Editorial

Local Action, National Measures, International Problems

Under the Local Air Quality Management regime, many local authorities will, by October this year, find themselves having to produce action plans aimed at achieving the air quality objectives within Air Quality Management Areas. In effect, this will mean reducing traffic pollution, despite having a relatively limited range of measures at their disposal. By the Government's own admission, the expected improvements in vehicle and fuel technology will not, on their own, be enough to deliver clean air across the UK. So the Transport Bill currently before Parliament is an opportunity to give LAs some additional powers to tackle pollution hotspots.

A wide range of authorities are now considering the idea of Low Emission Zones, which seek to reduce emissions from road vehicles by encouraging the use of cleaner vehicles, or reducing the number of vehicles overall. Research by the NSCA Cleaner Transport Forum has shown that there is considerable potential for such zones to contribute to improving air quality. A second important area is that of Roadside Emission Testing. Seven local authorities have been piloting roadside testing using a fixed penalty scheme, and the Government will shortly announce whether the scheme is to be extended to other authorities.

Both Low Emission Zones and Roadside Emissions Testing will be important weapons for local authorities in their fight against pollution. However they are currently hampered by a lack of powers and resources to introduce effective initiatives. NSCA is promoting a new clause to the Transport Bill which seeks to provide a framework for such initiatives.

We welcome the Government's continuing commitment to tackle air pollution, but it places a heavy burden on many authorities who lack a full range of measures to implement air quality management policy. By no means all authorities will require additional powers. Those that do will need to be sensitive to the social and economic impacts of their enforcement actions. But the fact remains that the number of options available to address transport pollution is extremely limited. The Government's response to this amendment will be a significant indicator of its determination to protect public health and the wider environment.

With this edition of Clean Air, we have included the current edition of the Newsletter of the International Union of Air Pollution Prevention and Environmental Protection Associations (IUAPPA). The decision to circulate the Newsletter reflects a recognition of the pervasive importance of the international dimension to air quality. The great majority of UK environment legislation is now EU-driven and we can no longer regard UK policy as an independent entity. Transboundary air pollution problems in Europe are now recognised as having a hemispheric, indeed global, dimension; and climate change is of course an avowedly global phenomenon. Members who would like more detailed information about IUAPPA's work are invited to contact Loveday Murley at the Brighton Office.

Finally, NSCA is rapidly catching up with 21st Century technology and is currently revamping its membership and contacts database. The new system will allow us to work more efficiently, targeting our mailings to ensure that the right information reaches the right people. To help us help you, please fill in the questionnaire in the centre pages of this issue and return it as soon as possible. If you need additional copies, contact Sally May at head office. And don't worry, we won't offer you a personal loan, insurance or pizzas, just better, more targeted information.

National Noise Action Day Wednesday 7 June 2000

NSCA is funded by DETR to encourage action to reduce the
impact of noise on the quality of life

A free pack of leaflets, a poster and resource list is available on request from NSCA on 01273 326313

Promoting a responsible attitude to noise is increasingly important as complaints about noise frequently
result from lack of consideration and communication.



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NSCA News & Views

Towards A Noise Strategy For The UK

This paper was prepared by NSCA's National Noise Committee as part of its campaign to have a national noise strategy published by the Government. It was submitted to DETR in January and is intended as the starting point for the debate on the form and content of such a strategy. This area of policy is likely to develop rapidly and contributions from members would be welcome.

1. Introduction

Noise occupies a paradoxical position in terms of UK environment policy. By contrast with other pollutants, it is almost universal in our urban areas, is increasingly encroaching on rural, "tranquil" areas, and is progressively eroding the period of night-time quiet. Despite this, the control of noise has never been subject to an overarching policy or legislative framework, in the same way as, for example, air quality or waste disposal. This neglect may be partially explained by the fact that the effects of noise on the general population have been historically easy to overlook. In addition, the nature of noise, and the reaction of people to it, does not lend it easily to the sort of mechanistic approach available to other pollutants.

However, there is evidence, from various sources, that the general public is unwilling to accept excessive levels of ambient noise in their living environment as quality of life becomes increasingly valuable. While noise is transitory in nature, the effects it has over human health, and the quality of life and urban environments, are cumulative and so it comes under the umbrella of sustainable development. Therefore, if full integration with other social, environmental and economic issues is to be achieved, there must be a more strategic approach to the measurement, understanding and control of environmental and domestic noise.

The relative absence of data mean that scope for the rapid development of such a strategy, with clear targets and measures, may be limited. Nevertheless it is important to develop a more coherent and integrated policy framework and get into place specific timetables and targets for priority issues. It is also important that this framework is set within the context of the UK Strategy for Sustainable Development and that it encompasses the social and economic aspects of noise, as well as the environmental. The emphasis of the strategy must be ambient noise, the main source of which is road transport, although industrial, domestic and leisure noise must also form an integral part.

2. Setting Objectives and Targets

The strategy needs to have an overall and clearly stated objective towards which it, and the actions it contains, must be directed. While we would not wish to pre-empt the necessary discussion on the form of this objective, the following may offer a "working objective" for the time being:

"To minimise environmental noise, where it is cost effective and practicable to do so, within an economically, socially and environmentally sustainable transportation, commercial and industrial infrastructure"

The development of more detailed objectives and targets, should then be addressed in a way which reflects the special characteristics of noise as a pollutant. There is a crucial divergence here from other strategies, in particular that for air quality. A noise strategy cannot be built on the development of absolute standards or objectives as this would ignore some of the quintessential aspects of noise as a pollutant. The variation in the subjective reactions to noise, the difficulty in quantifying quality of life and the valuing of amenity and its loss all act against the setting of blanket standards. Simple application everywhere of health-based thresholds, as has been done for air quality, will not suffice, because of the need to cope with annoyance and quality of life considerations.

The provision of adequate access to tranquillity, both spatially and temporally, is a key issue and one which the strategy must address. Given the current limitations in knowledge concerning both the noise climate and the effect of that climate on the population, any targets should be incremental and progressive rather than absolute. Nevertheless there should be an overall goal which might best be expressed in terms of securing a universal access to the "rights" in respect of noise annoyance, as articulated by the World Health Organisation.

As part of this process, there should be a review both of current legislation and of the standards, formal and informal, currently in use by enforcing authorities, house builders, designers, etc. There are many instances where numerical targets, proposed in the 1960s and 70s to suit conditions and technology then in play, are still in regular use by authorities and others. These are occasionally reviewed or amended on an *ad hoc* basis resulting, and in a sense reflected, in a disjointed and inconsistent noise control regime. An assessment of these quasi-official standards is required, and they need to be either updated or replaced with a more relevant and strategic enforcement and assessment system.

3. Analysis of Key Sources

In parallel with the establishment of an overall objective for the strategy, an up-to-date assessment of the key sources of environmental noise and noise annoyance should be assembled. This assessment will need to consider the trends in the principle sources, their impacts, both in terms of the severity of effects and the numbers affected, and the metric by which sources are measured. The principle source categories included in this assessment are likely to be:

- Neighbour noise
- Leisure noise
- Industrial noise
- Transport/general environmental noise

The assessment should not, at this stage, attempt to prioritise sources; this is a task which should be open and informed and should come during later stages of the strategy development. It should also be borne in mind that while transport is the principle source of environmental noise, it is by no means the principle source of complaint. The strategic priorities, when they are set, should therefore reflect the public's concerns and should engage the general public by addressing their main preoccupations in the noise field.

Furthermore, the source analysis recommended above, should in turn inform the development of a clearly defined noise research strategy. It should also assist in clarifying the Government's stance on Noise Mapping and the role it sees for this in an overall process of noise assessment and management.

4. Assessing the Relevance and Effectiveness of Abatement Measures

In the next stage, the strategy needs to pull together a coherent Government assessment of what can be achieved in the main abatement options. In particular:

1. We need a more coherent approach to the consideration of noise within the planning regime. There should be a Government commitment to review and strengthen this, as well as a clear indication of its views as to the scope for progress;
2. There is at present no apparent process for reviewing recent and potential progress in technical abatement options, particularly in the fields of sound insulation, vehicle noise control technology, and road surfaces. The Government must develop a process for assessing the respective costs and benefits of these approaches, and its current view of their potential contribution to noise abatement;
3. Given the social character of noise, education and incentives can play a critical role. The Government has largely left this to voluntary bodies and, given what are often very tight budgetary constraints, it has not received the profile it deserves. While it should not itself necessarily take the leading role, the Government should at least give a clearer indication of where responsibilities in this area lie, and what the key focus should be;

4. The Government must also set out, within the wider context, the role it sees for regulation in relation to noise, addressing the following issues:
 - i. the outcome of its review of domestic noise legislation, and the scope for regulation in this field;
 - ii. how it sees the treatment of industrial noise being carried forward, in the context of IPPC and in particular whether it proposes to maintain a role for nuisance legislation. The options considered should include the possibility either of moving progressively to a Prior Authorisation approach to industrial noise emissions, or of developing Best Practicable Means as a general legal obligation, rather than simply as a defence to nuisance charges;
 - iii. the effectiveness of the current building regulations in ensuring that domestic sound insulation is of a sufficiently high standard, and the relationship of this to other environmental policies.

The combination of the analysis of the main sources and the effectiveness of the abatement options should then closely inform the process of setting the strategy's priorities. NSCA would strongly support the use of the methodology for the development of environmental standards set out in the twenty first report of the Royal Commission on Environmental pollution to develop the priorities. The full and early integration of public values and concerns into the strategy will greatly enhance the relevance and importance of the final document.

5. The Framework for a Strategy

Following the analyses detailed in the previous sections, the framework of a final strategy will have begun to emerge. The elements of this framework, again from the previous sections are the objectives for the strategy, the principle sources of noise, the abatement options and a preliminary set of priorities for action. However, in order to strengthen this framework and to enable key action areas to be identified, the strategy should also cover the following:

- how noise mapping might be used at local level as a data collation and presentation tool, and as a basis for testing local strategies and delivery options. This should be linked to national policies and priorities;
- a systematic approach to the assessment of costs and benefits, which should be built into the earliest stages of strategy development, rather than incorporated at a relatively late point as with the Air Quality Strategy;
- notwithstanding a predominant focus on environment (and therefore largely transport) noise, an attempt to address separately three specific problem areas:
 - a. eliminating hearing damage or measurable health impacts from identifiable sources - notably leisure events;
 - b. household noise - a long term policy in the context of the Government's recent review and the

possibilities for raising the standard in terms of domestic sound insulation, both in terms of new build and the existing housing stock;

- c. a policy framework for the treatment of industrial noise which can guide the way noise is addressed within IPPC, and clarify the relationship between statutory controls and nuisance, in the context of the role of Best Practicable Means.

While all the above issues have challenging features, it should be possible to evolve a clear stance on each of them with relative simplicity. The central issues of environmental noise, and in particular transport sources, could then be addressed. The Society's view here is that the Strategy should take the form of a phased programme with the following incremental objectives:

1. Seeking to avoid deterioration in the noise climate and protection of tranquil areas (and times);
2. Development of a wider programme of measures to ensure that the likely impact on noise levels of increased vehicle numbers and more intensive use over the next 20 years is offset.
3. Identification of priority areas for supplementary local action and the implementation of measures to reduce noise levels in these areas, avoiding displacement to non-priority areas;
4. A general framework for reducing overall noise levels by, amongst other things, planning measures, implemented through guidance to local authorities which allows them to assess local priority areas.

6. Assigning Responsibility

The final element of the strategy, once the framework is assembled and the priorities established, is to assign

responsibility for action under these priorities. It is very important that action is taken at the appropriate scale and that there is a clear understanding by all involved as to what this is. Clearly, some actions, for example the control of noise from vehicles through manufacturing standards, lie most appropriately at the European level. Other actions are most appropriately vested in National Government and Agencies, others for regional government, still others for local government, etc. While this may appear obvious, other strategies and policy areas have failed where responsibility is not properly assigned, or where the actions do not fit with the scale of organisation in which they are vested.

The strategy must therefore clearly assign responsibility and tasks for:

- Central Government
- National agencies
- Regional bodies and devolved administrations
- local government
- Business and industry
- voluntary organisations and NGOs
- individuals

In setting these responsibilities, there must be a full and participative dialogue with all those involved and attempts must be made to engender a sense of ownership of the issues. In the process of developing the strategy, a full analysis of the resource implications should be undertaken. In identifying the sources for the necessary resource, the strategy should adopt an innovative approach, to include the hypothecation of fees and charges, incentives for industry and direct grant support for individuals involved in improving their noise environment.

Achieving The Renaissance: A Managed Approach

This paper was submitted to the Environment Select Committee as a contribution to their investigation of the Urban White Paper proposed by the Government. It sets out NSCA's response to the final report of the Urban Task Force, chaired by the architect Lord Rogers. The report, Towards an Urban Renaissance, is both wide ranging and visionary and the paper that follows argues that, in order to achieve such a renaissance, there needs to be careful urban management vested in, and operated at, the local level. The Select Committee's report was published in late February.

Introduction

The NSCA welcomes the Committee's investigation into the proposed Urban White Paper and the question of urban form and regeneration. In considering this issue, we feel that the final report of the Urban Task Force, *Towards an Urban Renaissance*, referred to as the Rogers Report, sets out an optimistic and radical view of the way forward for

Britain's towns and cities. As such it provides an excellent foundation for the proposed White Paper and we would encourage the Government to implement its recommendations in full over time.

The Report is however exceptionally wide-ranging, taking in architectural form, spatial planning, investment programmes, environmental management, transport provision and land remediation. While it provides the appropriate context and vision for the development of UK urban policy, it contains many policy strands which now need to be prioritised. NSCA believes that if the White Paper is to provide a basis for effective change it must be explicit as to those priorities and develop policy accordingly.

One of the key aims of the Urban Task Force when it was established was that it should address the issue of land contamination, and how brownfield sites in urban areas could be identified and brought into beneficial use. Ultimately, however, the Task Force did not address this at

any length, although it did propose the launching of a national campaign to clean up all contaminated land by 2030.

This is a laudable aim, but itself involves serious difficulties which the Task Force has again not addressed in any detail. These include the adequacy of current information and research programmes; the absence of clear implementation mechanisms; and the question of how innovative measures in the other areas covered in the Report (e.g. fiscal measures, streamlined planning system, improved public investment, priority areas, etc) will relate to the remediation of contaminated land. It is important that the White Paper now address this issue, and NSCA may therefore wish to submit a supplementary memorandum specifically on it.

Having said this, NSCA believes that the priority for the Urban White Paper, if it is to provide a successful framework for the revitalisation of our urban and sub-urban areas, must be a new approach to urban environmental management, based on strong local leadership, with the flexibility to implement a radical and sustainable vision. This role should be vested in the local authority, which needs also to be given the tools necessary to undertake effective management and enhancement of local environment quality. While other considerations put forward by the Rogers Report are of vital importance, for example, architectural design standards, spatial planning reforms and new investment structures, these should be seen as secondary to the development of the local leadership and management functions. Without these latter elements, the urban renaissance is unlikely to come about.

We therefore draw the Committee's attention in particular to the proposals set out in Chapter 4 of the Rogers Report. NSCA hopes the Government will endorse these and make them the central focus of the White Paper and, in certain respects, indicated in this submission, go further. We would also encourage the Government to accelerate the Modernising Local Government programme, with particular regard to the development of mechanisms by which local people can participate in their local governance.

Enhancing Local Environmental Quality

The urban environment, in contrast to most others, is almost wholly governed by the behaviour decisions of people. The perceptions of, and respect for, their local environment will fundamentally influence the way they behave within it and towards it, and this behaviour will in turn affect that environment's quality. In this way, cycles of environmental decline can be initiated by relatively minor issues, e.g. small amounts of litter or graffiti, but can very quickly escalate into an almost irreversible slump. It has been shown on many occasions that a clean and well maintained urban environment dramatically affects its perception and therefore its prospects. High quality urban environments and through them the Urban Renaissance, depend crucially therefore on effective, efficient and well directed environmental management.

To enhance the quality of the urban environment, and the effectiveness of the services on which this depends, NSCA believes that there are four principal requirements:

- more effective leadership by local authorities, with clearer duties and powers;
- enhanced resourcing for local environmental services, with scope for innovative financing through environment, hypothecation and other routes;
- more effective delivery of services and enforcement of regulation, in particular to secure early remediation of problems, for instance through a variety of innovative warden services in respect of use of public areas, allied with increased powers to intervene in and secure improvement to private land;
- measures to minimise the impact of vehicles in urban areas and the turbulence they induce.

Community Leadership

The ability of local authorities to manage the local environment on an open and consultative basis needs to be strengthened. The experience of many European cities which have successfully rejuvenated themselves suggests that a style of local government which engages and involves local people is a vital ingredient. Barcelona provides an excellent example of a city which has developed and implemented a clear and radical urban vision in conjunction with, and not in spite of, its populace. The Government's necessary reforms of local government have not yet adequately addressed this, although there is some progress. This should be enhanced in several ways:

- i. The Local Authority Sustainable Development power in the current Local Government Bill should be enacted as a duty, and should be strengthened;
- ii. With this should come the obligation to produce community plans which can secure the effective integration of transport, air quality, waste, noise and other local plans. There are important synergies among these policies which authorities should be encouraged and enabled to exploit.
- iii. These provisions - rather than narrower and more prescriptive options such as spatial master plans, regeneration companies or other mechanisms - should be the core of the White Paper approach. The key, as the Report implies, should be the broad power of local authorities to enter partnerships.
- iv. Local authorities should be given greater flexibility in the application of national policy at local level, so that packages of provisions can be devised which more effectively fit local needs. This points to the wider use of 'adoptive' legislation, as in the Noise Act 1996, although such greater freedom of action should be steered by the use of strong participative consultation mechanisms.

Resources

The decline of the UK's urban infrastructure and public sector housing stock has largely been due to inadequate investment not only in maintenance but also in management. Yet investment in management and maintenance has major multiplier effects, and failures of

maintenance can induce spirals of decline. The White Paper should therefore:

- Accept the recommendations for a commitment to reverse the recent year-on-year declines in the resources available to local authorities for local environmental services.
- Complement the enhanced leadership role of local authorities with wider powers to transfer resources between programmes to reflect local needs and priorities.
- Pursue stronger enforcement of local environmental regulation by fixed penalty charges which can be hypothecated for local environmental purposes.

Management and Enforcement

The Police Core Task Review has left local authorities with little capacity to enforce essential environmental regulations. New forms of warden service are required to carry forward effective management of the local environment. A precedent for what can be achieved is the way reintroduction of warden and caretaker services has proved the critical ingredient in the regeneration of many run-down local authority estates. These provide a clear, permanent and locally based link between the community and the local authority/enforcement bodies.

A number of options should be available:

Civic Wardens

This service, already well-established in some local authorities, provides an identifiable and integrated function dealing with vandalism, graffiti, fly-tipping, abandoned vehicles, and generally monitoring the adequacy of street cleaning and environmental quality.

Widening the Civic Warden Function

A step beyond this is to widen the scope of such a service to give it a part in identifying breakdowns in local quality - holes in the road, broken street furniture, etc - and ensuring rapid turn-round of remediation. This identification role must obviously be backed up by a swift, visible and reliable response by the local authority, possibly through the use of dedicated 'rapid response' teams.

Community Wardens

There should also be powers and resources for authorities to move to a wider concept of 'community wardens' who would not only undertake functions related to environmental quality management, but also extend significantly into social and welfare responsibilities, acting as focuses for identifying and consulting on local social problems. This could lead into areas of anti-social behaviour, including pre-emptive action on neighbour noise problems, and similar issues.

Civic Warden Services have generally been very successful when implemented in a positive and high-profile manner, with the aim of addressing a wide range of local environmental quality and enforcement functions. Providing the powers and resources to enhance these functions should be a key element of the White Paper.

Impact of Traffic

The Rogers Report recognises the damaging impact of current vehicle congestion levels, which must be expected further to increase, not only in terms of noise, pollution and danger but also in terms of the general turbulence it imposes on urban life in many areas. NSCA sees the apparent recent shift in Government policy to address pollution exclusively by improvements in vehicle technology, rather than by controls on the number of vehicles or the way in which they are used, as potentially damaging to urban prospects. The presence of busy roads in an area can often lead to blight and isolation, and the value of their removal should not be underestimated. The reduction of urban traffic levels and the provision of car free areas will not only reduce pollution and noise but will also greatly enhance environmental quality. It will also increase the levels of physical activity, through walking and other street activities, decrease the sense of isolation and increase community cohesiveness.

NSCA therefore considers it very important that the White Paper should:

- offer support to the concept of 'Home Zones', as advocated by the Rogers Report;
- support the concept of 'Low Emission Zones', which can reduce the environmental impact of vehicles by excluding some of the more damaging categories of vehicle from sensitive urban areas.

A number of important new measures to ease urban congestion have been proposed or adopted by the Government recently in such areas as control of non-domestic parking, congestion charges, etc. The White Paper needs to offer a framework for applying these, and developing good practice, in the circumstances of urban neighbourhoods. More generally, the White Paper needs to signal that while more inter-urban roads and by-passes may be needed, within urban areas there is no realistic alternative to a more strongly regulatory approach which depresses private vehicle use and mitigates the environmental impact of vehicles.

Cleaning Up the Local Environment

Much legislation for maintenance of local environmental quality is now inadequate for its purpose, in particular in such areas as land clean-up, litter control, and contemporary problems such as abandoned vehicles. The White Paper should address two issues in particular:

- Local authorities still have no effective powers to intervene to secure clearing-up of private land which can rapidly undermine neighbouring properties and wider areas. This is a difficult issue which needs to be tackled through streamlined and enhanced powers for local authorities to take action;
- More generally, legislation in this field is too legalistic and bureaucratic, and inhibits local authorities taking action to remove nuisances with the speed that is necessary. An example of this is the removal of abandoned vehicles, which can be extremely lengthy and costly to deal with. More streamlined and

simplified powers with greater discretion for local authorities may be a prerequisite of more effective action.

There are, however, a number of powers already on the statute books which could enable action to clean up the local environment but which are either not widely understood or otherwise are overly complex to implement. The Government should, therefore, carry out a comprehensive review of current legislation, particularly in the planning and environmental enforcement fields in order to identify:

- which powers exist and how they can best be utilised;
- barriers to the implementation of current legislation, including barriers which exist between professions working in local authorities or between tiers of local government;
- ways in which this legislation can be amended, updated and streamlined;
- how this legislation fits into the general vision of urban renaissance.

Joint Working – the Regional Partnership Approach

The problems faced by many local authorities are not confined to their borders alone and both the causes and effects of urban decline extend into other areas. For example, the traffic which congests a town centre will often have originated in another local authority area and action to combat it will require a concerted partnership approach

between different local authorities. In addition, many of the UK's urban areas exist as conurbations where the boundaries between different authorities can appear, for practical purposes, somewhat artificial.

It has been shown on many occasions that joint working between neighbouring authorities, or groups of authorities, can prove highly successful. One example of this is in the implementation of the Local Air Quality Management regime, where local authorities have formed joint working groups in order to pool their resources and expertise. The structure and working arrangements of these groups will vary according to local circumstances but what is clear is that they are able to provide solutions which would not be available to authorities working in isolation.

The key features of this type of arrangement are that they provide flexibility, are issue lead and that they are highly cost effective. We would therefore urge the Government, through the White Paper, to encourage this more informal approach to joint working on regeneration issues, rather than adopting rigid regional structures which can often simply add another layer of bureaucracy to an already bureaucratic system.

This article was submitted to the Environment Transport and Regional Affairs Select Committee as part of their investigation into the proposed Urban White Paper. It was included in the Memoranda Submitted to the ETRA Committee: Session 1999-2000: HC 185-II Proposed Urban White Paper, published by The Stationery Office Limited. Parliamentary Copyright House Of Commons 2000.

NSCA Produce AQMA Guidance

With the review and assessment process now well under way, it is expected that many authorities who have needed (or will need) to progress to "Stage 3" will be completing their reports during the first half of 2000. Those authorities who identify parts of their area where they expect the air quality objectives to be exceeded by the relevant future year, will be required to designate such parts as an Air Quality Management Area (AQMA).

The AQMA occupies a somewhat paradoxical position in the whole Local Air Quality Management regime. In one sense, it is simply a requisite administrative process which marks the boundary between the preparatory phase and the actual management phase of LAQM. However, it also gives a legitimacy to the action plan which follows and the way it is defined will have a formative influence over the management phase. Nevertheless, it should always be remembered that the AQMA is simply one step in the process and not an end in itself. It should also only exist within the context of a wider local air quality strategy and the action plan may well have to operate in that wider context in order to be effective.

The designation of an AQMA raises many new challenges for local authorities. Among these are how to define the

geographical extent of the AQMA, how to communicate the implications of the AQMA to the local community, and how to collaborate with neighbouring authorities who may also be declaring adjacent AQMAs. Air Quality Management Areas: Turning Reviews into Action has been prepared by a Working Group of the NSCA's Air Quality Committee. It aims to provide practical advice to those local authorities who are concluding their Third Stage review and assessment reports, and are moving towards the designation of an AQMA. The report does not deal with the formulation of specific action plans following the designation of an AQMA, and it is intended that this matter will be dealt with in a separate, future publication.

One of the first challenges facing an authority will be to define the geographical boundary of an AQMA. This is potentially a difficult issue, particularly where the AQMA boundary bisects areas of local communities. The Third Stage review and assessment report is required to describe those areas where an exceedance of the objective is likely, and to then recommend areas for which it is proposed an AQMA should be designated. The uncertainties of both modelling and monitoring assessments will however need to be borne in mind when undertaking this task.

It must be accepted that predicting air pollutant concentrations in future years is not an exact science, and it is anticipated that authorities will need to apply a degree of professional judgment in drawing the boundary line for the designated area. In many cases, the precise description of the geographical exceedence of an objective is unlikely to be critically important from the air quality management perspective. In this respect it is more important to determine the approximate extent of the exceedence, together with which sources are predominant, so that an effective and well-targeted action plan can be formulated. This report sets out the various issues that may lead to uncertainty in modelling studies, and the section concludes with a recommended approach towards the determination of modelling uncertainty.

Once the review and assessment is concluded, and it is determined that the objectives are likely to be exceeded, the authority will need to declare by order an AQMA. This requires the authority to notify third parties, to undertake a further assessment of air quality to supplement the information already gained during the Third Stage review and assessment, and to submit a plan for approval to DETR. It is expected that legal challenges will be mounted in some cases, and the authority will need to be in a position to defend the actions it has taken. The document sets out the legal and administrative requirements for the declaration of an AQMA.

Consultation and communication with all appropriate stakeholders has been a fundamentally important issue throughout the review and assessment process, and the effective involvement of all local partners is expected to be high on the agenda, particularly if widespread involvement in local air quality action plans is to be achieved. A recommended approach to consultation and communication is set out in a step-by-step fashion, and is supported by a case study.

Finally, it is well recognised that air quality does not respect administrative or political boundaries, and it is expected that in many cases, AQMAs will cross several or more authority areas. In such cases, regional or local partnerships (particularly where these have been formed during the earlier stages of review and assessment, will have an important role to play, and are strongly encouraged. The benefits of regional groupings, and the manner in which authorities can work together, are explored, and supported by reference to a number of case studies.

The guidance document *Air Quality Management Areas: Turning Reviews into Action* is now available on request. It is free of charge to members and representatives, and at a cost of £5.00 to non-members. Copies can be obtained from the NSCA offices in Brighton or by emailing sales@nsca.org.uk.

Local Action Needed To Meet National Pollution Targets

In February, the Chairman of NSCA Council, Keith Horton, wrote to the Transport Minister, Lord Macdonald, asking him to clarify the Government's position on whether local transport management measures will be required to meet the national Air Quality Objectives. Government policy, supported by NSCA and reiterated in the recent Air Quality Strategy, had been that technological improvements to road vehicles would not be sufficient to achieve either the national Air Quality Objectives or the EU Limit values for some pollutants, in some areas. In this case, locally directed traffic management measures, such as Low Emission Zones, would supplement national action. Recent press reports and briefings however, had suggested a shift in policy towards the sole use of technological improvements to improve air quality.

In his reply, received on 1 March, the Transport Minister reaffirmed the Government's support for locally based traffic management measures to combat air pollution. Lord Macdonald said that "as the Air Quality Strategy makes clear, these [technological] improvements may not in themselves be enough to secure compliance at all locations with either our national air quality objectives or with the EU limit values". He went on to assure NSCA that "there is no

presumption against use of these [management] measures where they are necessary, in addition to technological improvements, to meet air quality targets."

Richard Mills, Secretary General of NSCA said that "the confirmation of the Government's support for an approach to air quality improvement which balances national measures and locally targeted action, makes clear the duty for local authorities and individuals to play their part in the battle against pollution. The way is now clear for cost-effective and proportionate traffic management measures which will go a long way towards improving the urban environment for all."

The two pollutants most likely to require additional traffic control measures in order to achieve the targets are nitrogen dioxide and fine particles (PM₁₀). These are strongly implicated in the estimated 24,000 additional deaths per year from poor air quality and their major source in urban areas is traffic. NSCA has been engaged in promoting management measures designed to get the worst polluters out of the areas of highest pollution. These measures are also likely to improve the general environment of our towns and cities by reducing the noise and disruption caused by excessive traffic levels.

NSCA Promotes Amendments To Transport Bill

NSCA has consulted a number of local authorities on possible amendments to the Transport Bill, which would give local authorities additional powers to implement local air quality management. We had already suggested draft amendments to Part II of the Bill to empower LAs to set environmental performance standards for buses when establishing bus quality partnerships. The Government has now introduced its own amendment to give effect to this.

The remaining concern is local authority enforcement powers for roadside emission testing and low emission zone enforcement. Under the *Road Traffic (Vehicle Emissions) (Fixed Penalty) Regulations 1997*, a limited number of local authorities have been piloting **roadside testing** using a fixed penalty scheme which has proved:

- difficult to operate, because only the police can stop vehicles, and available police time is limited;
- uneconomic, because the fixed penalty has not been adequate to cover enforcement costs (as the Government had intended);
- unpopular, because the fixed penalty is resented by motorists who were unaware that their vehicle was out of tune.

Many authorities are now considering the introduction of **low emission zones**, which limit access to vehicles meeting

specific emissions characteristics. Such zones would need to be enforced either by traffic wardens or suitably trained local authority officers.

Most authorities would like the capacity to run emissions checks and low emission zones enforcement using funding hypothecated from the workplace parking levy, congestion charging, or other sources. Amendments are needed:

- to allow LAs to fund pollution enforcement activities;
- to test vehicles in accordance with the *Road Vehicles (Construction and Use) Regulations* and to issue vehicle rectification notices where the vehicle fails a test;
- for suitably trained officers or traffic wardens to stop vehicles for testing;
- to fine or prohibit vehicles which contravene low emission zone entry requirements.

NSCA believes that Part III of the Bill should be amended to include a new Clause to give scope for the Government to introduce new Regulations, following widespread consultation, for roadside testing and LEZ enforcement. The Liberal Democrat team on the Committee Stage of the Bill has now agreed to place amendments relating to air quality management. Depending upon the Government response, we hope to promote further amendments to the Bill when it reaches the House of Lords. Further information from Tim Brown: tbrown@nsca.org.uk.

Public Acceptability Of Incineration

NSCA is initiating a new research project on the public acceptability of incineration. Waste to energy (WtE) plant are likely to play an increasing role in the management of waste in the UK, particularly in the south of England, where landfill capacity is dwindling. Requirements in the EC Landfill Directive, to divert an increasing percentage of biodegradable waste, may also prompt an increase in energy recovery from waste. NSCA believes that, from an environmental perspective, WtE plant can often represent the best environmental option for waste disposal – especially when integrated into a waste management system which optimises re-use and resource recovery.

Proposals to develop WtE plant are inevitably controversial on three counts. Firstly there is the usual reluctance of people to see any large-scale development in their area, with the construction of a new facility and associated increase in vehicle movements, etc. Secondly, there are specific fears about the health impact of emissions from incineration plant. Thirdly, a more general concern that incineration reduces the impetus to recycle, and still produces ash which requires landfilling.

NSCA has a reputation for producing widely respected consensus-based reports on controversial environmental issues. We see an opportunity to address the issue of public acceptability of incineration through a project which:

- investigates public fears of WtE development;
- looks at the process of public consultation and involvement, using case studies;
- produces advice for developers and regulators;
- produces an independent public advice leaflet which sets the risks of WtE plant in context;
- recommends further action for improving public information.

We are assembling a partnership group of interested organisations, and have appointed an experienced consultant to undertake the research and report-writing. A smaller, independent advisory board will oversee the project and ensure objectivity and balance.

We expect to fund the project through contributions from participating organisations, either as a direct grant, or via landfill tax offset contributions. Any organisations interested in participating should contact Tim Brown at NSCA: tbrown@nsca.org.uk.

Sustainable Development Awards

Winners of the 1999 Innovation in Sustainable Development Awards have all now planted trees to mark their prize winning work. The Awards were established last year, with generous sponsorship from the UK Petroleum Industry Association, to recognise local authority achievement in furthering sustainable development through innovative projects.

At a planting ceremony on Paddington Green in February, a mature oak tree was presented to Cllr Alex Segal JP, Mayor of Westminster, representing Westminster City Council. The Westminster Clean Air Campaign was praised for its major contribution to improving quality of life in the urban environment and for setting a standard for authorities throughout the country. Making the presentation, Derek Osborn, CB, President of NSCA said "We are delighted to recognise the splendid work of Westminster. Their own air quality strategy, and in particular their approach to emissions and fleet management, provides a model of good practice for air pollution control in urban areas. Not only does it improve the quality of life of all Westminster residents and workers, it represents an important contribution to the wider Air Quality Strategy for London



which must now be produced under the Greater London Authority Act".

Christian Cleret, President of UK PIA said "The UK Petroleum Industry is committed to promoting clean air and to improving quality of life for all of us in our local communities. We are delighted to sponsor these awards and congratulate Westminster on their success."

A planting ceremony was also held in Birmingham to mark Birmingham City Council's Award for their Sustainable Indicators for Birmingham. The tree was presented by Chairman of NSCA West Midlands Division, Councillor Steve Norman to Councillor Margaret Wells.

ISD Awards 2000

The success of ISD 1999 and the continued support of UK PIA, enable us to continue the awards scheme. In April all local authorities will be invited to submit projects for assessment. The categories for 2000 have been chosen to give recognition to the diversity of work being undertaken by local authorities - projects which promote the development of sustainable management practices within the local authority, partnership projects, and projects using innovative technologies. Awards will be presented at a London ceremony in December.

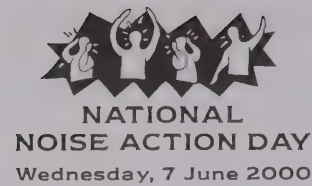
To register for further details and an application form, contact Mary Stevens – mstevens@nsca.org.uk

New Database For Head Office

The Brighton Office has invested in a new database to manage our membership and contacts lists. This will increase the efficiency of our mailshots by targeting members, representatives and other contacts nationally and internationally interested in particular subjects. It should also cut down on any duplicates you may have been receiving.

A database is, however, only as good as the information held on it so please help us by completing the questionnaire attached at the centre of this edition of Clean Air.

National Noise Action Day 2000



Preparations for National Noise Action Day 2000 are well underway. NSCA is co-ordinating activity by local authorities, schools and other groups and there is already a high level of interest from all sectors. The main focus of NAD 2000 will be neighbourhood noises – we would like to encourage everyone to take a quiet moment to consider the noise they make and the noises that disturb them at home.

The following are available from us to help you take part in NAD.

- A Noise Action Day Information Pack – this is targeted at local authorities and contains examples of successful NAD events last year, contributions from other organisations concerned with noise, redesigned NSCA noise leaflets and DETR noise leaflet.
- A4 colour decibel chart
- An A2 colour cartoon poster depicting neighbourhood noises
- Noise Action Day Leaflet

- Sounding Off, the Noise Pollution Education Pack for secondary schools – looks at the science of sound and the social impacts of noise. It covers maths, science, geography, design and technology and PSHE. £5.00 inc from NSCA.

Many local authorities have already confirmed that they will be promoting NAD this year, along with mediation groups and schools. Activities planned included donation/auction of seized equipment, work with schools and mediation groups and highlighting local noise issues.

The DETR have employed Forsters PR consultants to promote NAD more widely at national level. They will be carrying out research to find England's most annoying noise and managing a national event in London on the day.

To find out more about NAD – what's going on and how we can help – contact Mary Stevens mstevens@nsca.org.uk

To order materials to help you run a successful NAD event contact Sally May smay@nsca.org.uk

NSCA Scotland

Light Pollution

Around 60 delegates attended NSCA (Scotland)'s third and final seminar of 1999, held at the Central Hotel in Glasgow in November. This one day event is believed to have been the first seminar in Scotland which has had light pollution as its theme and was certainly a move onto new ground for the NSCA. Delegates were mainly from local authority disciplines, including environmental health, planning and roads and lighting, but there were also representatives from industry and consultancies.

On the evidence of the day's proceedings it appears that this emerging environmental concern is creating increasing difficulties for members of the public. The seminar was chaired by NSCA Secretary General, Richard Mills, with speakers from local and central government, industry and campaigners.

What's the Problem?

The main issues surrounding light pollution, which can impact in two ways, were described as:

- intrusion by overbright or poorly directed lights trespassing onto neighbouring property and affecting the neighbours right to enjoy their own property, e.g. from security lights or sports facilities;
- skyglow, i.e. the orange glow seen over many towns from upward light which is a serious problem for astronomers as the artificial brightness of the sky overpowers distant stars, especially those low in the night sky.

Although local authorities receive regular complaints concerning light pollution, they have no statutory enforcement powers to deal with this form of pollution and few have a set policy or recognised format for dealing with light pollution complaints. A number of measures are available to alleviate the effects of light cast onto areas not intended or being wasted upwards into the night sky.

How Big's the Problem?

The first speaker of the day, Claire Dodd from the Environment team at the Scottish Executive, emphasised the Scottish Executive's awareness of the concerns arising from complaints relating to light pollution; both they and their predecessors at the Scottish Office had undertaken surveys of Scottish local authorities in order to gauge the extent of the problem in Scotland. The first of these, in 1995, showed that in 1994 a total of 99 light pollution complaints were received by local authorities. Of these, 65 (66%) related to domestic security lighting. The survey also found that 23 out of the existing 52 local authorities in Scotland in 1994 did not receive any light pollution complaints. Most complaints were dealt with informally by EHOs within the local authorities.

A second survey was carried out in 1998 and considered the complaints received by Scottish local authorities during the years 1995-1997. Over this period a total of 234 light pollution complaints were received with 156 (67%) relating to domestic security lighting. In around 66% of cases the local authority successfully employed mediation to deal with the problem. Respondents were also asked who within local authorities they believed should deal with these complaints, with 29% saying planners, 26% EHOs, 38% both, with 6% unsure.

Finally, Claire Dodds highlighted three areas of possible future action which the Scottish Executive and other bodies could consider should lighting problems continue to be of concern. These were:

- to make light pollution a statutory nuisance.
- to amend planning controls
- to encourage change by better guidance and education.

Technical Issues

The next two speakers, from a lighting engineering background, provided some of the technical detail on lighting for an audience of whom many were not knowledgeable on such matters. Steve Austin from Philipps Lighting indicated how light is measured and described what the manufacturer is looking to achieve in the design of their product. He explained that there are two main measurements used in lighting - illuminance, measured in lux, and the measurement of light falling onto a surface. He then went on to demonstrate, using examples, what sort of considerations manufacturers are guided by when designing or providing lighting equipment for specific tasks. For example, British Standards exist for residential lighting as well as road lighting. Sports facilities require a minimum level of lighting to ensure safety. And for major sporting arena, such as large football or rugby stadiums, floodlighting levels are dictated not by what is necessary for the players on the pitch but rather what is specified by television companies.

Some of the practical methods available to control lighting were then described by Dave Coatham, Technical Services Manager from the Institute of Lighting Engineers. Before going onto this he emphasised that the first questions to be asked when assessing light is, 'Does it need to be lit?' 'Could safety be achieved by other methods, such as screening or segregation?' Additionally, overlighting can be a common problem. He said that one instance of this involves the Sports Council who give grants to provide sports facilities and stipulate levels of lighting to be achieved by the applicant which are often more than is practically necessary.

The direction of light is obviously important and a number of methods were outlined which ensure that a light is only directed to where it is needed. Such methods cannot only be used to prevent intrusive light but also to reduce the wastage of light into the night sky. Dave Coatham concluded by observing that lighting in itself is not a problem. It only becomes a problem where it is excessive, poorly designed, badly installed or poorly maintained.

Legal Issues

The next speaker, Frank McManus, Senior Lecturer in Law at Napier University in Edinburgh, looked at light as a possible nuisance from a legal perspective. He defined nuisance as 'an adverse state of affairs which exists outwith the pursuer's property (which) unreasonably interferes with the enjoyment of the pursuer's land.' This covers a multitude of scenarios and a variety of circumstances have been capable of ranking as nuisances at common law. These include smoke, dust, odour, fumes, noise, rubble and water. Scottish courts have shown a degree of flexibility in admitting new categories to this list, often dependent on the social attitudes prevalent at that time. He argued that there was no reason why light should not rank as a nuisance and could do so as long as a court was prepared to say so. He outlined a number of factors that a court could take into account to determine if a state of affairs were a nuisance. These include: the social utility of a defender's conduct; the motive of the defender; the locality of the affair; the duration, intensity and time of day of the event; the sensitivity of the pursuer; the need for a state of affairs to exist; and whether the pursuer could have avoided the discomfort. A number of examples were used to illustrate these factors.

To finish Mr. McManus discussed whether existing statutory law would cover nuisance from light. He concluded that the *Environmental Protection Act (1990)* would probably require to be amended to make light a statutory nuisance as the Act in its present form relates to the static state of premises rather than the use to which they are put.

Planning Issues

Having looked at light pollution from an environmental health perspective, the first speaker of the afternoon came from a planning background. Alistair MacDonald of Glasgow City Council used his presentation to exhibit a number of slides that offered pictorial examples from Glasgow of both good and bad lighting particularly in relation to the lighting of buildings. Those who are familiar with Glasgow will be aware that architecture and the enhancement of the City's many magnificent buildings is always topical and particularly so during 1999 when Glasgow was the UK's City of Architecture and Design. He stressed that outwith the developmental stage there was little that planners could do to prevent poor or inconsiderate lighting. The developmental stage, of course, refers not only to construction of buildings but also to significant changes to a building or other facility.

Solving the Problem

Bob Mizon, UK Coordinator of the Campaign for Dark Skies, which is sponsored by the British Astronomical Association, illustrated his talk with the clever use of some spectacular astronomical slides; he demonstrated the effects of wasted upward light on the night sky and the benefits in viewing the night sky if sensible measures are employed. He argued that the starry sky is, unofficially, a site of special scientific interest and that for three million years people had, on a clear night, been able to observe it. In the last fifty years, though, ill-directed light had taken it away from many in the developed world. He maintained that his organisation did not recommend the switching off of any necessary light, rather that what was required was the right amount of light, directed as needed.

The final speaker was a man who, it is believed, is the only person to have successfully led an action relating to light pollution through a court in the United Kingdom. This was Stonehaven solicitor, Graeme Garden. Stonehaven is a town in the north east of Scotland, not far south of Aberdeen. In 1989 a dispute arose between the local angling club and an adjacent tennis club after the latter proposed to install a set of four floodlights. They received planning consent for this with conditions. One of these was to not allow the light to fall onto the local river which was noted for its sea trout pool.

Following installation of the lights it was found that light did indeed cast over the river with its sea trout pool. The anglers naturally protested. Agreement was reached between the two clubs to alleviate this problem. This included the insertion of baffles on the lighting equipment and a restriction on the use of the lights during certain crucial periods. This amounted to dusk during a 10-week period in the summer when the sea trout were most active.

Unfortunately, it became clear after a year that the agreement was not working and the anglers contacted a solicitor in 1995. A civil action was prepared which sought an interdict, i.e. a cessation of use of the lights, during the critical period for sea trout. An interim interdict was subsequently granted by the Sheriff Court. The Sheriff noted that one of the key features of the anglers' case was that in taking their action they were not seeking damages but only the removal of the lighting nuisance during critical times. An appeal was considered by the tennis club but this was later dropped after a few minor concessions were made by the anglers. This interdict remains in force to the present day.

Mr. Garden concluded his presentation by stating that he felt that there was no need for new legislation to deal with light nuisance but that common law procedures were available and sufficient.

More Information

NSCA (Scotland) have had a lot of positive feedback to this seminar and clearly there has been a need for various disciplines and other interested parties to discuss this issue. As a consequence of this event NSCA is producing a leaflet on light pollution is to be added to our series of public information leaflets and should be available in the near future. (*Alastair Brown, NSCA Scotland*)

Electromagnetic Fields, Telecommunication Masts & Mobile Phones

The Scottish Division's first seminar for 2000 took place at the Moat House Hotel, Glasgow in February and followed their AGM. As with the previous seminar the subject broke new ground for NSCA. Electromagnetic fields and, in particular, the issue of health effects from mobile telephones and their telecommunications masts is a subject which has been attracting an increasing amount of attention. In Scotland the matter has been debated in Parliament and been the subject of investigation by the Transport and Environment Committee. A number of prominent players, including some of the seminar's speakers have been invited to speak to the Committee who were expected to make recommendations in the Spring. The seminar was chaired by Tim Brown, NSCA Deputy Secretary, Policy & Development.

Introduction

There are at present conflicting views being expressed on the safety or otherwise of a rapidly expanding telecommunications network and the debate has many of the hallmarks of a classic environment v. economics clash. Many feel that there is no established health effect and any restriction on the expansion of the network will be detrimental to the industry and United Kingdom business in general. Others argue that although no health effect from telecommunications masts or mobile phone handsets has been established, the potential is there and should not be ignored. They urge a cautious approach and that the proliferation of masts in sensitive areas should not be allowed until firmer evidence of safety to the public health is available.

EMF Exposure Guidelines

Dr Alastair McKinlay from the National Radiological Protection Board (NRPB) also chairs the International Committee on Non-Ionising Radiation (ICNIRP). Their status is voluntary but they provide international exposure limits which all EC member states are obliged to consider and report. Dr McKinlay described the various EMF exposure guidelines and how they are derived. The main guidelines referred to in the United Kingdom are those recommended by the NRPB. Values for occupational and general public exposure are given. These values though slightly higher than those recommended by the ICNIRP, are still well below any values derived from health studies which were believed to produce a health effect. For the future development of exposure guidelines, Dr McKinlay recommended that more scientific data was required with independently managed research. Global harmonisation of the exposure guidelines from the various issuing bodies world-wide would also be of benefit.

The Operators' Views

Nick Greer from Vodafone, one of the four main operators of mobile telecommunications in the United Kingdom, said that while he recognised public worries and that there was an association between visual intrusion and EMF concerns, there appeared now to be a perception of a lack of control by local planning authorities as well as local communities; there was also a general lack of confidence in governmental judgements on such matters nowadays probably as a result of other health scares. Balanced against this, though, there is an astronomical growth in public demand for mobile telephones with some 24 million currently owned in the United Kingdom.

The expansion in mobile phone technology means that there is an increasing demand for other services such as short message text, vehicle tracking, asset management, security issues, etc. In December 1999 alone there were 86 million text messages sent over the Vodafone network. There are economic considerations here as well with 100,000 people employed in the industry and many businesses in the United Kingdom relying on the technology. Nick Greer also pointed out that many other industries generated EMFs, including broadcasters, emergency services, Ministry of Defence, Civil Aviation Authority, etc.

Nick Greer then outlined the criteria that Vodafone and other operators require satisfying when selecting sites. These include:

- a consideration of the technical limitations;
- environmental concerns, such as visual intrusion;
- what would be acceptable to the landlord;
- compliance with NRPB guidelines for EMFs; and,
- obviously, that the site is buildable.

He concluded by stating that Vodafone are committed to addressing concerns and had recently set up their own EMF advisory unit.

Planning Issues

Miranda Marshall, representing the West of Scotland Planning Officers Forum, illustrated some of the problems facing Planners when dealing with telecommunications applications and outlined what they can and can't do. Firstly, Planning Departments can frame telecommunication policies and give them statutory force in structure and local plans. Planning Departments cannot, however, control permitted developments - the vast majority of applications for telecommunications masts in Scotland fall into this category. Planning Departments cannot operate a precautionary principle as advocated by some for public health reasons, neither can they consider land ownership or tenancy. In fact, telecommunications operators can force access to a building without the landowner's permission.

Miranda Marshall highlighted a number of problems, which included a lack of knowledge on the part of all parties,

particularly on the role of others; the existing legislation is outdated for what is a new and rapidly evolving technology, and this is compounded by the phenomenal expansion of the telecommunications industry. She concluded by suggesting the tools needed by planners if they are to deal with this issue:

- greater knowledge of the business both in terms of who the operators are and the equipment they utilise;
- in a Scottish legal context, more appropriate interface between United Kingdom telecommunications law and Scottish Planning law;
- who polices the industry at present. The answer appeared to be nobody, though she felt effective policing was required.
- up to date and sound guidance is certainly required to deal with Planning and Telecommunications issues.

David Paris from Renfrewshire Council's Environmental Services Department spoke about his own Council's experience of EMFs. Following an application for planning consent by an operator to site a telecommunications mast in the Renfrewshire district, (planning consent was required as the mast was to be over 15 metres high), objections were raised with the Council on the grounds of health risks. As a result of widespread political and media interest, the Council decided to look at how it dealt with the issue of telecommunications masts.

Council officers found it to be a complex issue: there are various regulatory parties with an input including HSE, DTI, NRPB as well as local authorities. This becomes a recipe for confusion and overlap. There is dispute among medical and health experts on the risks. EHOs, whilst having a role in protecting public health, do have to work within the statutory framework and cannot be self-appointed experts nor should they simply play the role of public reassurance officers. A further complication was that there was a school close by and many objectors argued that a mast should not be allowed in residential areas or near schools. But this is not straightforward either: how do you define a residential area; is it the same to all persons? How many houses are required? David Paris also reminded the audience that typically pupils were only at school for around 15% of any given year. Would this not mean that exposure during the other 85% of the time is more important?

Renfrewshire Council decided to undertake measurements of electromagnetic fields around the area concerned, and an external contractor was appointed to undertake the measurements. Three locations were selected – an adjacent block of flats with existing telecommunications equipment, a block of flats with none and the nearby school. Forty measurements were taken over three days, which were all found to be well below NRPB guidelines.

The original planning application was however refused on the grounds of visual intrusion and as a hazard to pedestrians on a substandard road. The operator appealed and the Council's refusal was overturned with the development being allowed to proceed. Although this particular application has now been determined, it

highlights a number of questions which still need answering including:

- a 'safe' level of electromagnetic radiation across the frequency spectrum is required;
- if there is no 'safe' level, should mobile phones and transmitters be banned?
- what should be done about non-phone transmitters?
- mobile phones use pulsed signals. Does this make a difference and who else uses pulse modulation?

Since the publication of the contractor's report for Renfrewshire Council, the Council has decided to lift its embargo on new masts on Council property.

Possible Health Risks

Dr Sheila Johnston, a neuroscience consultant, discussed the possible risks to health arising from the use of telecommunications equipment. She stressed that when reviewing the scientific evidence it is necessary to consider all the evidence that meets the WHO criteria for good research and not just the negative or positive results which vested interests tended to do. She believed that the best expert group we have at present is the NRPB and agreed with their conclusion that

"overall the existing scientific literature encompassing toxicology, epidemiology and other data relevant to health risk, while providing useful information, provides no convincing evidence that radiotelephones pose a long-term public health hazard".

This conclusion was based on a survey of 410 scientific papers. Whilst there are several more papers on the subject she believed these 410 to be of sufficient scientific merit and that reference should only be made to them. She then went on to look at specific health effects.

Firstly, cancer. She quoted one scientific paper which stated that, *"there is no clear evidence for a carcinogenic action relevant to intact humans but similarly it is difficult to argue that a carcinogenic mechanism can be ruled out".*

For thermal RF effects, *"heating is the major effect of exposure at frequencies greater than 100KHz. Restrictions on whole body heat loads are expressed as SAR..."*. She went on to say, though, that currently public exposure is 100 - 1000 times below the SAR guidelines.

For genotoxicity, *"the data from a wide range of standard genetic test methods involving mammalian and non-mammalian assays do not support the concern that RFR poses non-thermal genotoxic risk".*

For the human nervous system, *"...there is no positive evidence that pulsed or continuous microwave exposure in the non-thermal range confers elevated risk to the health of the brain".*

Dr Johnston went on to discuss associated matters. Firstly that there was a possibility that the risk perception/worry could be a causal factor for certain symptoms. Secondly, that despite concerns being raised that medical devices could be adversely affected by radio waves of a certain

frequency, research had in fact shown no evidence that cellphones or base sites do interfere with such equipment. As far as future research was concerned Dr Johnston reported that there would be around 200 mobile phones/health effect research projects underway in the next three years. She stressed that findings from any single study has to be replicated and published before acceptance of the findings is possible. She also advised the audience that when evaluating any such study, check the methodology. If no SAR is reported then the experiment is poor.

In conclusion, Dr Johnston stated that she was not worried by the new technology at present but will be interested to know what will happen in the future. She was keen to see industry making information available in the future to the public and to governments. She reported that industry was funding research more than anybody else at present.

The next speaker, also from a medical background, urged a greater degree of caution in our approach to mobile phone technology. Dr Helene Irvine, Consultant in Public Health Medicine with Greater Glasgow Health Board reported that there had been a huge increase in electromagnetic fields in Western towns and cities over the last 20 years. While there have been published accounts of research which has suggested non-thermal biological effects, she argued that a lack of replication or of a known mechanism did not necessarily mean that the findings of such studies were wrong and that we could suffer the consequences of ignoring such evidence. (There has, of course, been historical precedent here and Dr Irvine cited the debate some 40 years ago on whether smoking caused disease.) Dr Irvine suggested that the current debate on mobile phone technology was probably not aided by it centring on a multi-billion pound industry promoting a highly desirable product with wholehearted Government backing. She further argued that it was too early to answer the question on ill-health in humans using epidemiological techniques. We simply do not know what the long-term effects of this technology will be and whether they are cumulative.

Dr Irvine advocated that authorities adopted a precautionary approach towards telecommunications equipment. She stated that the measuring equipment currently in use was believed to be of inadequate sensitivity, that there was no known safe level of EMFs, and that though those levels presently recorded are low they are not necessarily benign. Finally, she believed that there was a lack of a standardised monitoring policy. She was able to provide a number of examples of authorities throughout the world adopting such a precautionary approach including within her home country of Canada. Dr Irvine concluded by saying that the principle of minimising preventable environmental exposure should be applied to EMF as much as it is to water, air, noise and light pollution. She did not

believe that the cellphone is an indispensable necessity of life to be promoted and distributed to every member of society at all costs.

More Information Needed

The final speaker of the day also advocated a precautionary approach. Alasdair Philips represented the pressure group Powerwatch, who describe themselves as an organisation who supply the public with information about the possible hazards that have been associated with our use of electricity, radio and microwaves. He described reported health problems from mobile phone technology including headaches, earaches, buzzing in the head, eye problems, poor short-term memory, skin irritation, neck and joint pains, unusual fatigue and tiredness and, in the case of proximity to masts only, sleep disruption. Often public concern can be generated by mixed messages. Complete denials (from industry) were not believable. He cited examples of other hazards which have been denied but eventually proved to be real. These included radium creams, x-rays in pregnancy, thalidomide, asbestos, lead in petrol, smoking, BSE and DDT.

He suggested that the only answer to the question 'do EMFs impair health?' is 'perhaps.' When potential damage is both uncertain and significant it is necessary to act on the basis of the precautionary principle. He urged industry to negotiate with local communities and compromise where possible. The way forward for handsets, he said, was for them:

- to be properly labelled with non-alarmist warnings,
- to be supplied with screening cases and
- to have improved design to reduce SAR.

The removal of tariffs which encourage users to use up free allocated time every month would also be of benefit.

For base stations, he suggested, the way forward was for:

- better consultations with local councils,
- the avoidance of sensitive locations,
- sharing of masts where possible,
- placement of antennae as high as possible, and
- the adoption of a 3 V/m maximum signal level in public places which should usually result in less than 1V/m in buildings.

In closing the seminar, the Chairman, Tim Brown thanked the speakers for providing unbiased information in the face of conflicting evidence. He felt that they didn't seek to nail the subject but opened up issues that need further discussion. There was a lack of information on health effects from masts and handsets. The impression was that there is a vacuum here. Possibly the report due soon will resolve this and maybe the NSCA will have a role in finding a consensus. *(Alastair Brown)*

REPORTS

Implications Of The UK National Air Quality Strategy For Major Stationary Sources

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TXU Europe Power

TXU Europe Power have authorised the use of the TXU data presented in this article but the opinions expressed in this article are those of the authors alone.

This paper suggests some ideas that should assist any local authority, which lies in the neighbourhood of a major stationary source, to undertake a Stage 3 Review and Assessment. Based on studies of power stations undertaken by TXU Europe Generation (formerly Eastern Generation). Realistic scenarios of future sulphur dioxide emission are discussed. For coal-fired power stations for which the 15 minute average SO₂ concentration is the key objective to be met, it is shown that by using dispersion models a local zone of influence around a source can be defined. Only areas within this zone may be influenced by the source and this simplifies the analysis that needs to be undertaken. An example, using Rugeley Power Station, is demonstrated and the power station is shown not to exceed the 15 minute SO₂ objective. Similar conclusions may be drawn for other coal-fired power stations for which a detailed analysis has been undertaken by TXU. It is argued that fumigation episodes, which are not treated by conventional dispersion models, would not change this conclusion.

which are expressed in terms of short-term averages. The objectives for SO₂ in the National Air Quality Strategy include a 15-minute mean of 266 µg/m³ (100ppb) as an air quality standard, with the objective for the standard not to be exceeded on more than 35 occasions in a year by the end of 2005. A 1-hour mean objective of 350 µg/m³ (132ppb), not to be exceeded more than 24 times per year, and a 24-hour mean objective of 125 µg/m³ (43.7ppb), not to be exceeded more than 3 times per year, have been adopted as additional objectives to be achieved by the end of 2004.

In urban areas the 1-hour and 24-hour standards are rarely exceeded whereas the 15-minute objective is currently widely exceeded in the UK, at both urban and rural sites. These exceedences are associated with emissions from both large and small combustion plants, and domestic coal burning. Exceedences of the 1-hour and 24-hour objectives are confined to Belfast, and are associated with domestic coal burning which is still widespread in this area. The 15-minute objective is considerably more stringent than either the 1-hour or 24-hour objectives.

Conventional ground-based monitoring as operated in national programmes would need to be very extensive to identify occasions when plumes emitted from high stacks came to the ground and would require extensive meteorological measurements to unambiguously attribute fluctuating plumes to one source. In specified meteorological conditions the maximum ground-level concentration from a major point source will occur in a small region within the zone of influence of the source, and much lower concentrations and often zero concentrations will occur at other places. The Third Stage Reviews and Assessments of Part A and Part B processes will usually involve detailed dispersion modelling to determine the region over which each source could significantly affect ground-level concentrations.

Dispersion modelling is a specialised activity, but it is likely that major industries will have undertaken such studies as part of their IPC applications. For example, TXU who operate a number of coal-fired power stations in the

Introduction

The review and assessment of major industrial sources for air quality management purposes presents a technical challenge for local authorities which is somewhat different to that required for air quality assessments of roads and urban areas. Major industrial sources have been regulated under Integrated Pollution Control for a number of years, so are already scrutinised by an alternative legislative system. The design and operation of major industrial plant depends on techniques to limit emissions to the atmosphere and tall stacks to dilute emissions in the atmosphere. This dilution is usually far extent than that experienced by emissions from other types of sources released closer to the ground.

Under the current air quality management regime in Britain, very large emitting sources will be subject to a third stage Review and Assessment. The focus of this paper is on sulphur dioxide (SO₂), since SO₂ illustrates the problem of linking major emissions, high dilution and air quality objectives

Midlands have produced a series of reports in which the impact of their individual power stations have been assessed (Acres, 1999a, 1999b, 1999c and 1999d). The results from these studies should be of considerable assistance to any local authority planning a Stage 3 Review and Assessment which lies in the neighbourhood of a major stationary source.

Technical guidance has been provided by the DETR regarding methods for undertaking Stage 1 and Stage 2 Air Quality Reviews and Assessments. Less prescriptive guidance has been given on how more detailed Stage 3 reviews should be carried out. One expects that the review process should follow currently accepted, operational dispersion modelling methods based on the state of science in this area and this is the approach followed by TXU.

Studies of TXU Coal-fired Power Station Emissions and their Effects

TXU have carried out extensive modelling studies of the emissions from Rugeley (Acres, 1999a)), Drakelow (Acres, 1999b) Ironbridge (Acres, 1999c), and West Burton and High Marnham Power Stations (Acres, 1999d). The general results of these modelling studies of coal-fired power stations are reviewed in this paper. Further details of the modelling can be made available on request to TXU.

A great deal of work has been carried out during the last 30 years on dispersion modelling of emissions from tall stacks. Harmonisation activities in Europe and the USA have tested dispersion models on data sets, mainly from studies at tall stacks in the USA. The work of power companies in the UK is not as widely appreciated internationally. The work of the CEEB and successor companies on the monitoring and modelling of emissions from fossil-fuelled power stations has been summarised by Laxen (1996).

Future Emissions

Future concentrations from power stations depend both on the dispersion and the emissions of SO₂ at a future date. There is inevitably some uncertainty associated with future emissions, but future scenarios can be evaluated. The primary constraint on the operation of coal-fired power stations is the limit on sulphur dioxide emissions from the individual stations (the so called "A" limit), which is set by the Environment Agency under a power station's IPC Authorisation. The other factors that will affect the future operation of the station, include: (1) future UK energy policy; (2) the future mix of sources of coal supplies (domestic or imported); (3) future changes in the market mechanisms for electricity supply; (4) future divestments of coal-fired power plant by generating companies; and (5) future European and UK environmental policies.

None of these factors can be determined with absolute certainty at present, so it is necessary to consider a range of future operating scenarios for power stations, rather than one single case. The sulphur dioxide emission limit places a regulatory constraint on the maximum output from a power station, as there are supply restrictions on the type and source of coal that can be used. Other factors will set

commercial limits on a station output which may result in the actual output being far below the maximum possible "regulated" output.

One scenario is therefore to use the maximum regulated output as the basis for assessing the station's impacts on air quality in 2005. The impacts for lower output scenarios may be compared. In essence, the sulphur dioxide emission limit for a station fixes the maximum amount of total sulphur dioxide that can be emitted during any particular year. (There are other emission limits which take account of the total emissions by all TXU power stations in combination.) This means that, for any particular coal sulphur content, there is a maximum annual power station output that corresponds to the emission limit.

For example, the 2005 A limit for the 1000MW High Marnham Power Station is 25 kilotonnes. This corresponds to a load factor of 25% for an average coal sulphur content of 1.4%. For annual output to be greater, the coal sulphur content would have to be reduced. (Load factor is the actual output of the station during a year divided by the maximum possible annual output if the station operated constantly at maximum capacity for the entire year.)

1. operation at a load factor of about 25%; corresponding approximately to an average emission rate of 700g/s and,
2. operation at a load factor of about 40%, corresponding approximately to an average emission rate of 1200g/s.

Operation at higher load factors would require substantial quantities of imported low sulphur coal.

Enforcement of the Emission Limit

The emission limit reduction for TXU coal-fired power stations is part of agreed reductions from all UK industrial sources in accordance with the UK National Emissions Plan, which ensures that the UK will meet its obligations under the 1988 European Union Large Combustion Plant Directive. This was agreed in order to meet objectives for the reduction of acidification in Europe.

In practice, power stations of the type assessed tend to operate throughout the year, coming on to coincide with the times of morning and afternoon electricity peak demand during the day. The stations are generally shut down at night. There is also a seasonal variation, with longer periods of daily generation in winter and shorter periods in summer. This pattern is unlikely to change in 2005.

Most of the generation takes place during the late morning/mid-day peak demand period, which is also the time of day when adverse dispersion conditions are most likely to occur. As a result, although generation at a lower load factor reduces total generation time, the time of generation during the most adverse dispersion conditions does not reduce very much.

It has been estimated that many of the extreme conditions that contribute to the highest concentrations at a higher load factor will also be experienced under a lower load factor. It turns out that for load factors between 50% and continuous running (100%), the 35th highest concentration changes very little with changes in load factor, as the changes in running time are mainly at night during stable conditions. At 40% load factor the 35th highest concentration is about 90-95% of the 35th highest concentration when generation is continuous and at 15% load factor the 35th highest concentration is about 60-65%. In contrast reductions in the sulphur content of coal results in a directly proportional reduction in all concentrations.

Limitations of Dispersion Models

The techniques applied in dispersion modelling are inevitably associated with some uncertainty. Factors of uncertainty are recognised in the assessments, such as (1) very local meteorological data is not available; (2) an artefact of some models is that they produce contours that involve sharp gradients which are not realistic (the annual average concentrations contain particularly implausible small scale variability); and (3) the dispersion models do not generally describe meteorological conditions varying in time. Although these factors introduce some uncertainty in predictions, none will lead to systematic underprediction of concentrations at the worst case location.

Any atmospheric dispersion model will always have a degree of error due to unavoidable inaccuracies in the recorded meteorological data and the simplifications made in the model to describe atmospheric processes. In addition, atmospheric mixing has an inherent degree of randomness, arising from the turbulent flows in the atmosphere. Turbulence introduces random changes in the strength and direction of the air flow. The random effect of turbulence is obvious when watching a visible plume on a sunny day with low wind speeds.

As a result of turbulence, if a plume is released on a series of occasions under the same meteorological conditions, then the detailed behaviour of the plume will be different every time. The values of every parameter affecting dispersion are identical, but the path and dispersion of the plume will be different due to turbulent mixing.

If a release event is repeated many times then it is possible to determine the average plume concentration, and the statistical distribution of the concentration around the average. This is the approach taken by computer models of plume behaviour. Although turbulence randomises the path of a plume at any given moment, it is possible to determine the overall probability of different plume trajectories, and to build up a prediction of the average pattern of dispersion.

Mathematical models therefore incorporate approximate, probabilistic descriptions of complex atmospheric processes. These models can give reliable predictions of the actual behaviour when averaged over many occasions. However, the model results for individual hours will rarely match the actual dispersion due to the inherent random error from turbulence.

Concentrations predicted by any dispersion model and concentrations specified by air quality objectives should be regarded as the average concentrations for a set of similar

atmospheric conditions. Dispersion models should not be used to assess extremely unusual events. The assessment is not able to predict concentrations in every conceivable atmospheric condition. For the study of pollution episodes involving high concentrations different techniques would be appropriate.

These features do not undermine the validity of the results from dispersion modelling, but they do emphasise the need for caution in drawing conclusions from modelling alone. This is particularly true when modelled values for maximum concentrations are being evaluated.

Commercially available dispersion models should have been validated against standard data sets of recorded concentrations and meteorological conditions. These validation exercises are used to confirm that the models give reasonably accurate predictions of average concentrations, including the upper percentile concentrations. However, there are always differences between individual models and between models measured concentrations. These differences become more marked for very high concentrations.

Criteria for Significance of Individual Source Contributions

Given the likely uncertainties in assessments using dispersion models there is a need for general guidelines regarding the relative significance of SO₂ concentrations arising from major stationary source emissions. This is to assist in the identification of the impact areas which merit closer examination and to identify those areas in which the impact of the source is sufficiently low that it can be disregarded. Criteria have only been proposed for SO₂ as the modelling has only been conducted for coal-fired power stations, for the concentrations of other pollutants are far below the National Air Quality Strategy (NAQS) objectives and are not significant.

The NAQS objective for SO₂ limits the number of exceedences of the standard that should occur at any given location. The significance of the ground level concentration arising from a major stationary source therefore depends on the number of predicted exceedences. Table 1 presents some guiding criteria for the significance of the number of exceedences arising in a location due to an individual power station.

In Table 1 the 35th highest concentration that approximately corresponds to each number of exceedences of 100ppb have also been given. This allows concentration contour plots to be examined to establish the extent of the areas of high, medium, low and negligible significance. There is a direct relationship between the number of exceedences of 100ppb due to the power station and the 35th highest SO₂ concentration, which is determined by the shape at the high concentration limit of the concentration frequency distribution. The relationship shown in Table 1 has been derived using a number of SO₂ emissions scenarios and the ADMS dispersion model.

Areas of high, medium and low significance should be checked for combination with other substantial point sources of sulphur dioxide. The ratio of the 35th highest SO₂ concentration to the annual mean from a power station with a tall stack is of order 100. This is much higher than the



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How would you like to see the service we provide improve?

Table 1: Guiding Criteria for Significance of Concentrations from a Major Stationary Source

Number of 15 minute exceedences of 100ppb due to source	Significance of Effect of Concentration on Air Quality	Corresponding 35th highest SO ₂ concentration (ppb)	Notes
>35	High	> 100	Exceeds NAQS objective
5 to 35	Medium	80 – 100	Complies with NAQS objective but by a low margin
1 to 5	Low	50 – 80	Clear compliance with NAQS objective but still occasional exceedences of NAQS standard
0	Negligible	< 50	No exceedences of NAQS standard

ratio of the 35th highest 15 minute concentration and the annual average in an urban area which is of order 10.

Where the 35th highest concentration due to the power station is below 50ppb, other sources are extremely unlikely to simultaneously contribute the 50ppb required to result in an exceedence of 100ppb by combination. Only combinations with other major sources (e.g. another power station) need to be checked in this case. Where there is more than one major point source in the area the number of exceedences from these sources may be added. Where there are multiple stacks close together at a single industrial site, a conservative approach can be taken, and the predicted concentrations summed. When stacks are separated, it is extremely unlikely that the impact footprints for 15-minute mean concentrations will occur at the same location at the same time.

The computer model used for the analysis of TXU power stations was ADMS (Carruthers et al, 1995). With the provisos noted earlier concerning short term maximum concentration predictions, this model has been well tested, and is widely used for plume dispersion calculations. The modelling undertaken by TXU has only included the individual power stations in isolation. One limitation of ADMS (and other commercially available dispersion models) is that it cannot accurately model the long-range dispersion of plumes. Such models should not be used to assess concentrations beyond about 30 km from a source, especially in low wind speeds.

Footprint of Power Station Effects

Figure 1 shows the sulphur dioxide concentration contours for the 35th highest concentration from the ADMS model for a typical coal-fired power station such as Rugeley for a load factor of 40% and a 1.4% coal sulphur content. This corresponds approximately to an average emission rate of 1150 g/s through the year (although the actual emission rate will vary from hour to hour with output, as this changes to meet grid demand). This level of average emission is approximately equivalent to the maximum total annual emissions permitted in 2005 (the A limit).

Figure 1 shows that there is no area where the effect of the power station on air quality is of high significance, even at this maximum level of emissions permitted in 2005. There are three small regions where the effect can be considered to be of medium significance. There is an area out to a distance of about 10km where the effect of the power station is of low significance. Beyond 10 km from the stack in any direction, concentrations are below 50 ppb and can be regarded as of negligible significance. This 10 km radius marks the limit of the "footprint" of the station. Beyond this radius, the power station emissions alone would not generate exceedences of the NAQS standard and are extremely unlikely to contribute to exceedences, even in combination with other sources.

Table 2 shows the modelled maximum concentrations arising from the 40% load factor scenario for Rugeley and also from a lower load factor of 25%. The coal sulphur content is the same in each case, so this table illustrates the effect of reducing load factor in reducing maximum concentrations. The load factor of 25% is equivalent to an average emission rate of 720 g/s through the year. The location of the maximum is shown in Table 2 for both scenarios.

Table 2: Predicted sulphur dioxide concentrations in 2005 for a major coal-fired power station taking Rugeley as a typical example

Load scenario	Maximum Annual Average (ppb)	Maximum 35th highest 15 minute mean (ppb)	Number of 15 minute periods per annum exceeding 100 ppb
Operation at 40% load factor, 1.4% coal sulphur content (location relative to source)	0.8 – 1.0 (3000,2000)	80 – 90 (3000,1000)	5 – 20
Operation at 25% load factor, 1.4% coal sulphur content (location relative to source)	0.3 – 0.4 (3000,2000)	60 – 70 (3000,1000)	1-3 (or less)

Note: The location co-ordinates of the maximum values relative to the stack is given in brackets in units of metres.

Comparison with Environment Agency Tables

Further confidence that a model has been supplied properly with data is provided when alternative models are used on the same problem. This is provided in this case by referring to the Environmental Agency Guidance on Stationary Sources (GSS), although the guidance is based on the same underlying model. The Environment Agency has published tables (Environment Agency, 1998) which allow estimates to be made of the maximum concentrations arising from point sources. For the purpose of a Second Stage Review and Assessment, it is recommended that a local authority use the GSS model to predict the annual mean and the 35th highest 15 minute mean ground level concentrations of SO₂. The emission characteristics of major coal-fired power stations place them at the extreme limit of the tables and it is not possible to interpolate accurately.

However, Chart 22 in the tables suggests that the maximum 35th highest ground level concentration due to typical coal fired power station like Rugeley is likely to occur at about 3 km to 4 km from the stack. For the emission rate assumed in the ADMS modelling for 2005, the chart suggests the maximum 35th highest ground level sulphur dioxide concentration will be less than $267 \mu\text{g}/\text{m}^3$ i.e. just below 100ppb.

These results are broadly consistent with the results of the detailed ADMS modelling presented by TXU. The charts assume continuous power station operation throughout the year i.e. a 100% load factor, whereas typical coal-fired power stations will operate for less than half the time. Consequently the charts will give a significant overestimate of the maximum concentrations arising from the actual station operation in 2005.

Conditions leading to Pollution Episodes

For the great majority of time, the maximum concentrations due to the emissions from a major stationary source with a tall stack(s) will occur close to the source i.e. within 10 to 15 km. Under the majority of meteorological conditions, the plume only reaches the ground after substantial mixing and dilution has taken place and the resulting concentrations are very low. The maximum ground-level concentration arises because the plume has reached the ground, and is typically highest in high wind speeds or when high atmospheric mixing occurs. Once the plume has reached the ground, mixing continues so that concentrations are further reduced at longer distances.

Occasionally, high concentrations can occur at distances far beyond the normal range from a major stationary source. These episodes are due to exceptional meteorological conditions and occur infrequently, perhaps once every few years in a location at distances 30 km or more from power stations. One type of pollution episode occurs during very persistent low wind speeds in combination with a shallow boundary layer capped by a strong inversion. Under these conditions emissions from all sources, including power stations, can be trapped in the boundary layer. Mixing in the boundary layer is slow due to the low wind speeds, so exceptionally high concentrations can build up. The episode ends if the wind speed increases and greater mixing occurs.

In this kind of "trapping" episode a relatively large area is affected. All sources of sulphur dioxide in the region whose plumes are trapped in the boundary layer will contribute to the episode. The trapping also leads to very high levels of any other pollutants that have been emitted within the region e.g. particulates, nitrogen dioxide and hydrocarbons, so this kind of episode consists of a mixture of elevated pollutant concentrations. The composition of the mixture gives an indication of pollution sources. For example, power stations emit far lower amounts of these other pollutants, compared to sulphur dioxide, so the presence of these other pollutants would indicate that other pollution sources are playing a role in such an episode.

Another type of episode can occur in which the stack plume escapes through the boundary layer into stable conditions above, where it slowly disperses. The plume is then re-entrained into the boundary layer some distance from the source and reaches the ground with relatively high concentrations.

Because other sources may not necessarily be trapped in the boundary layer at the same time, this type of episode provides a more distinct "signature" from the individual source, consisting of a short-duration pulse of pollutant concentrations with ratios of individual pollutants that match the source characteristics. For example, power station plumes have a ratio of sulphur dioxide to total nitrogen oxides of about 5.

Monitoring data suggests that this type of "fumigation" episode due to power stations is relatively rare. It has been suggested as a mechanism to explain occasional elevated sulphur dioxide concentrations in areas remote from power stations. However, closer inspection of such locations has revealed other local sources of sulphur dioxide (e.g. cement kilns, domestic coal burning) which could also have an air quality impact in the area. A report on such episodes is under preparation.

Modelling of Fumigation Episodes

ADMS and similar recently developed dispersion models simulate boundary layer trapping and fumigation-type events that occur close to the source soon after release. However, they do not carry over concentrations from hour to hour. Instead the model starts afresh for each hour with a new set of meteorological conditions and a new release. Consequently the effect of changing conditions on a release after the first hour is not described. Modelling of long-range episodes therefore requires the facility to model the evolving trajectory of the plume, hour to hour. The Meteorological Office model "NAME" is one example of a model which is able to model episodes in this way.

Significance of Distant Fumigation Episodes

Sulphur dioxide is generally the pollutant of concern from coal and oil-fired power stations during these episodes. If distant fumigation episodes occur then the criteria suggested earlier for the significance of individual source contributions might not be valid as they are based on modelling and monitoring in the near field. However, distant episodes are rare because the necessary combination of stack height, plume buoyancy, boundary layer depth and strong elevated inversion occur infrequently.

Monitoring data suggests that distant fumigation episodes occur at most about 4 to 5 times per year across the entire Midlands. Work by the power generators and the Environment Agency on individual episodes discussed in a forthcoming report would support this frequency of occurrence. Monitoring records suggest that exceedence of the NAQS standard during the most extreme episodes lasts for three to four hours at most.

It is not possible to accurately assess the frequency of fumigation episodes from individual major stationary

sources because monitoring may not have detected all fumigation effects. In addition not all recorded episodes have contributions from coal fired power stations, as on some occasions the wind directions were such that no power station plume could have reached the affected area. An episode may not necessarily lead to a breach of the SO₂ objective. The impact of fumigation episodes is felt in different locations so that at any given location fumigation events are expected to occur less than once per year on average. Such a frequency of fumigation episodes would not lead to a breach of the NAQS objective for sulphur dioxide for an individual power station. The likelihood of fumigation episodes which involve several power stations (or several groups of power stations) affecting any one location in a single year is very low, given the random nature of the events and the distances involved.

Conclusions

It is shown that it is possible to define a local zone of influence around a major stationary source, using dispersion modelling, which encompasses all areas where the impact of the source may be considered significant. Only areas within the zone need to be analysed in a Stage 3 Assessment. This considerably simplifies the area that needs to be assessed in detail. Taking a major coal-fired source, Rugeley Power Station, as an example, the application of the approach is demonstrated. For Rugeley and other TXU coal-fired power stations treated in detail elsewhere, it has been shown that given future emission limits the 15 minute SO₂ objective will not be breached.

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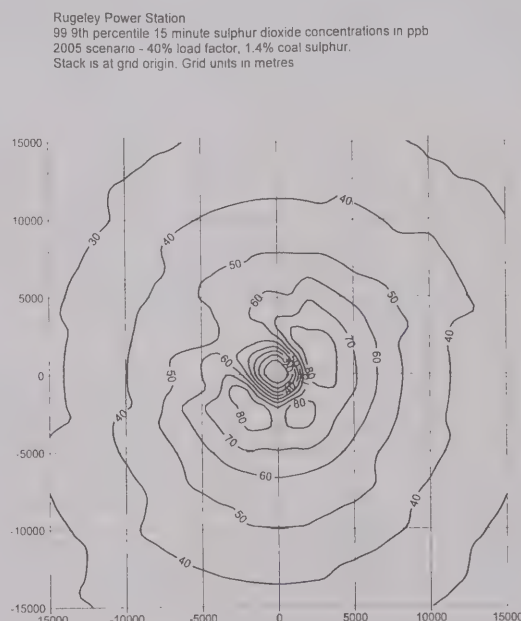
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Figure 1: 35th highest 15 minute average ground-level concentrations around a typical coal-fired power station.



Secondary Air Pollutants

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The term secondary air pollutants is generally applied to pollutants which are not emitted directly into the air but are formed in the atmosphere by chemical reactions between other pollutants and atmospheric gases. The three pollutants discussed here are ozone, nitrogen dioxide and secondary particles. Limit values for each of these pollutants are included in proposed EU 'Daughter Directives' on air quality and objectives have been included in the UK National Air Quality Strategy (DoE et al, 1997, DETR et al, 1999) (secondary particles contribute to the regulated pollutant PM10). Secondary air pollutants are of particular concern and interest because the response of ambient concentrations to emissions control measures can often be non-linear and more complex than for primary pollutants, such as sulphur dioxide, carbon monoxide or benzene. The origins, conditions leading to episodes of high concentrations and historical and likely future trends are described for each pollutant.

Ozone

Ozone (O₃) is formed in the atmosphere as a result of reactions between oxides of nitrogen (NO_x, the sum of NO and NO₂) and volatile organic compounds (VOC), in the presence of sunlight (PORG, 1997). The only significant reaction producing ozone in the atmosphere is



where M is any molecule which can dissipate the energy released in the reaction, such as O₂ or N₂. Oxygen atoms (O) are formed in the lower atmosphere by the photodissociation of nitrogen dioxide (NO₂):



The nitric oxide (NO) formed in this reaction reacts rapidly with ozone to produce NO₂ again:



resulting in no net ozone production. The photochemical oxidation and degradation of VOC (mostly hydrocarbons) species, which takes place in polluted atmospheres, however, provides an alternative route for the oxidation of NO to NO₂, removing the NO which would have reconverted the O₃ back to O₂, resulting in overall ozone production.

Episodes of elevated ozone concentrations in the UK generally occur on hot sunny anti-cyclonic summer days and are often associated with long range transport of ozone precursors from continental Europe across hundreds of km and over several days. The highest episode concentrations are generally experienced in rural areas

because ozone concentrations in urban areas are suppressed as a result of the reaction of ozone with local NO emissions. A comparison of peak ozone episode concentrations between the two periods 1972 - 1985 and 1986 - 1995 has shown a dramatic reduction in peak levels, due to Europe-wide reductions in emissions of ozone precursors (PORG, 1997). The year to year variability in episode frequency, on the other hand, is generally determined by meteorology.

Annual mean ozone concentrations are also lower in urban areas than in the surrounding countryside. This urban/rural difference is likely to decline over the next ten years or so because UK urban road traffic NO_x emissions are expected to decline to about half their 1996 value by 2005 (DETR, et al, 1999). Long term trends in annual mean ozone concentrations are influenced by both changes in European emissions of precursor compounds and changes in northern hemisphere background concentrations, which are in turn influenced by the atmospheric concentrations of long lived ozone precursors such as methane. There is also considerable inter-year variability in annual mean concentrations due to variations in meteorology. There are indications of a small upward trend in annual mean ozone concentrations over the last 10 years at many rural monitoring sites in the UK, presumably as a result of an increase in background concentrations. While there appears to be a consensus among the ozone modelling community that background concentrations will continue to increase, there is less agreement on the likely magnitude of this increase.

Nitrogen Dioxide

In contrast to ozone, the highest concentrations of nitrogen dioxide are generally found in cities rather than the countryside, with the highest concentrations being measured at the roadside, very close to sources of NO. Very little NO₂ is thought to be emitted directly into the atmosphere as a result of high temperature combustion processes; the bulk of NO_x emissions is in the form of NO, with subsequent chemical reaction to form NO₂. The dominant mechanism is oxidation by ozone:



Episodes of elevated NO₂ concentration in the summer occur when photochemical ozone episodes happen at the same time as relatively poor dispersion of NO_x emissions. The high concentrations of NO₂ measured in London in early May 1995 provide a good example of this type of episode (Broughton et al, 1997). The magnitude of summer NO₂ episodes is expected to decline over the next 10 years as a result of both reductions in NO_x emissions in urban areas of the UK and the expected decline in peak ozone

concentrations resulting from reductions in European emissions of ozone precursors.

The 'classic' example of winter episodes of elevated NO₂ concentrations is provided by December 1991 in London (Bower *et al*, 1994). An additional oxidation mechanism contributes to NO₂ formation at very high NO concentrations (above about 1000 ppb) because the rate of this reaction depends on the square of the NO concentration:



This type of episode is expected to become increasingly rare as UK NO_x emissions decline from their peak in the early 1990s.

Long term changes in annual mean NO₂ concentrations are influenced by changes in NO_x emissions, dispersion conditions and the availability of oxidant. In rural locations the oxidation is usually mostly complete, with the majority of NO_x being present as NO₂. Current NO₂ concentrations in urban areas are generally limited by the availability of oxidant and an empirical curve relating measured annual mean NO₂ to measured annual mean NO_x can be drawn (Stedman *et al*, 1998). Oxidation tends to be even less complete at the roadside. The expected 50% reduction in UK urban traffic NO_x emissions between 1996 and 2005 is expected to result in reductions in urban annual mean NO₂ concentrations of about 30% (Derwent, 1999, Stedman *et al*, 1998). Figure 1 shows a comparison of projected and measured NO₂ and NO_x concentrations at a site in inner London.

Secondary Particles

Secondary particles are formed from gaseous species in the atmosphere by chemical and physical processes. The main secondary particle contributions to PM₁₀ (particles less than 10 µm in diameter) and PM_{2.5} (particles less than 2.5 µm in diameter) in the UK are ammonium sulphate, ammonium nitrate, sodium nitrate and secondary organic carbon. Since these species are formed relatively slowly in the atmosphere, these pollutants are transboundary in nature. Unlike ozone and nitrogen dioxide, the spatial pattern of concentrations across the UK is expected to be much more uniform, without major differences between urban and rural concentrations. The majority of secondary particles are expected to be present as fine particles (PM_{2.5}), although a small fraction of nitrate particles are expected to have a diameter larger than 2.5 µm. The volatility of ammonium nitrate and secondary organic particles means that these species are unlikely to be detected by the TEOM PM₁₀ and PM_{2.5} monitors that are widely used in the UK. Both ammonium sulphate and sodium nitrate should, however, be quantitatively detected (APEG, 1999).

Ammonium sulphate is formed by the reaction of ammonia (for which the main sources are agricultural activities) with sulphuric acid. Sulphuric acid particles are formed by the photochemical oxidation of sulphur dioxide (SO₂), oxidation typically taking place over a timescale of 30-50 hours and over a spatial scale of 100s of kilometres. The main oxidation products of NO_x emissions are nitric acid, ammonium nitrate and nitrogen pentoxide. These species

do not form particles directly, but attach to pre-existing particles. Chemical reactions with pre-existing sea-salt particles lead to the formation of sodium nitrate. Relatively little is known about the importance of organic carbon particle concentrations in the UK. The main sources are expected to be photochemical oxidation of man-made aromatic hydrocarbons or natural biogenic hydrocarbons.

Sulphate particle concentrations are more widely measured in the UK than the other secondary particle species and sulphate concentrations have therefore been used as an indicator of secondary particle episodes. Such episodes can occur in both summer and winter in the UK and are often associated with dry weather, light winds and on some occasions transport of particles from sources in continental Europe. The most extensively studied secondary particle episodes in recent years took place during the early months of 1996 and receptor modelling has been used to quantify the contribution of secondary particles to measured PM₁₀ concentrations at monitoring sites in the UK during the episode (Stedman, 1998, APEG, 1999).

Reductions in European SO₂ emissions over the last 10 years has lead to a reduction in average annual mean measured sulphate particle concentrations across the UK of about 40%. European scale modelling of sulphate, nitrate and ammonium has indicated a likely reduction of about 30% in UK secondary particle concentrations between 1996 and 2010 (Tarrason and Tsyro, 1998). Sulphate concentrations are expected to decline more rapidly than nitrate; nitrates are therefore likely to make an increasingly important contribution to secondary particle concentrations.

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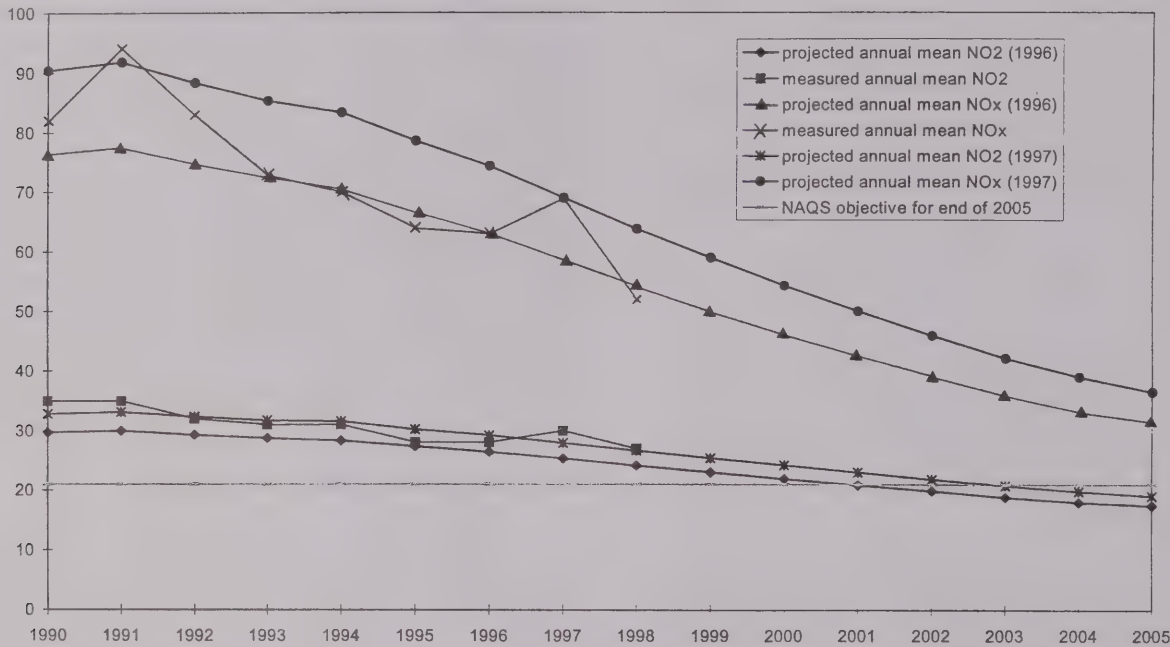
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Figure 1: Comparison of measured NO_x and NO₂ concentrations at West London with projections based on both 1996 and 1997 monitoring data (ppb)



A Method For Calculating Short Period Concentration Statistics From Annual Mean Concentrations

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Background

Over the last few years there have been great improvements in the advice and techniques available for assessing air quality. There are however three areas which consistently cause difficulties when assessing ambient air concentrations namely the:

- determination of the short period term statistic concentrations which are required for comparison to the Air Quality Strategy standards or objectives;
- combination of predicted contributions from a specific scheme to existing background concentrations; and
- determination of nitrogen dioxide (rather than total nitrogen oxides) concentrations.

Whilst methods are available to address all three areas, these can often involve complicated and expensive modelling or monitoring work. In many cases the modelling techniques have not been extensively validated and the methods of calculation involved are not transparent.

The new generation of dispersion models can generally calculate short-period statistics for direct comparison to air quality objectives. Some modelling methods, however, only provide data for long period means (typically annual means) and these data cannot be compared directly with the standards or objectives for short period statistics. The calculation of short period concentrations is straightforward when only a limited number of sources are being considered and there are few, if any, other

significant sources in the area. It is less straightforward to assess the total ambient concentration resulting from the combination of local, national and international sources. To achieve this, very detailed modelling is required that includes total emissions from regional, national and international sources. These emissions ideally need to be correlated with the hour of day in which they occur and the corresponding meteorological conditions. Such modelling may be appropriate in some cases but there are many cases where a simpler, cheaper and equally robust method is appropriate, for example Stage 2 Local Air Quality Management (LAQM) reviews can be used.

The combination of predicted short period contributions from a specific scheme with background concentrations is difficult because peak short-term concentrations from a particular scheme (e.g. road or industrial plant) are unlikely to occur at the same time as peak background concentrations. Moreover, concentrations expressed in statistical terms cannot be combined without returning to the original hourly values. It is only valid to combine modelled long-term average concentrations with equivalent background concentrations for a given period (usually a year).

One approach for the determination of short period concentrations resulting from multiple sources, including "background" is to calculate the combined annual mean concentration by simple addition of the annual mean contribution from each source and then use empirically derived fixed ratios or conversion factors to determine short period statistics. This method is used in several Government guidance documents, including DMRB², and the pollutant specific guidance³. For example, for road sources, DMRB suggests a factor of 5 for converting an annual mean nitrogen dioxide concentration to the equivalent maximum hourly mean concentrations.

Another area of difficulty is the determination of nitrogen dioxide concentrations resulting from emissions comprising mainly nitrogen oxides (e.g. combustion sources). Again, this can be done from knowledge of plume and ambient chemistry but simpler techniques can sometimes be appropriate. None of the commonly used dispersion models (including new ones) attempt to deal with this complex chemistry in anything other than a rudimentary way.

Development Of A Simple Method To Calculate Short Period Concentrations

The method presented here was developed during the public inquiry into the Heathrow Terminal 5 proposals, which began in 1995 and continued for four years. The air quality evidence was based on annual mean concentrations calculated from Heathrow, regional and national emission sources combined with simple ratios to give the limited number of statistics required for comparison with the Air Quality Standards⁴ that were current at the time. The introduction of the new short-period statistics in the Air Quality Strategy published in 1997⁵ required a different approach.

Examination of monitoring data from a range of sites suggests a broad correlation between annual mean concentrations and a number of short-term statistics. To explore this further a regression analysis of measured annual mean concentrations and shorter period statistics from a UK data set provided by NETCEN was carried out. The data set covered the period 1973 to 1996 where available (although some of the statistics included 1997 data) at a range of rural, urban and road sites in the UK. This analysis also examined the correlation of nitrogen dioxide concentrations with nitrogen oxide concentrations. The result of this work was a series of equations describing the relationship between annual mean and short period statistics. An example of such a correlation is given in Figure 1. This shows the relationship between annual mean NO_x and NO₂ concentrations.

The monitoring sites around Heathrow⁶ were excluded for the regression analysis so that the efficacy of the estimation procedure could be tested. This test involved the calculation of the short period concentrations from *measured* annual mean concentrations and comparing the results with *measured* short period concentrations. On the basis of this test it was agreed, by all parties represented at the inquiry's Air Quality Joint Data Group, that the regression methodology (as set out in inquiry document BAA/818) would be used for the calculation of short period statistics from the modelled annual mean concentrations. A summary of these comparisons for the current strategy (and some other) objectives is given in Table 1.

The results in Table 1 show that the short period concentrations estimated from measured annual concentrations using the best-fit equations could be both over and underestimates of the measured values as might be expected. The calculated short period concentrations in the Heathrow area were, generally, over estimated compared with the measured value. As might be expected over and under estimates were largest for very short period concentrations, e.g. maximum hourly values. This observation is consistent with that found when attempting to model short period concentrations; the shorter the period the greater the uncertainty in the calculated concentration. The ranges of values are better in many cases than would be expected from equivalent dispersion model derived values and many are comparable to the normal uncertainty associated with measured values.

If the relationship between background and source contributions was to change with time the relationship between annual mean and shorter period concentrations may also change. This aspect was examined during the development of the method and no discernible variation was identified from historical data. From this examination it was concluded that these relationships were therefore likely to be valid for future years. To maintain the confidence in the methodology in the future it will become necessary to repeat the analysis using more recent data, as these become available.

The Method

The relationships between short period and annual mean concentrations determined from the UK data set are given

in Table 2. It is important to remember that the method was developed when the objectives and air quality data were reported in volume/volume units. Accordingly all concentrations are in parts per billion (ppb), except for carbon monoxide (CO) and PM₁₀ which are in parts per million (ppm) and micrograms per cubic metre (µg/m³) respectively. The equations are not valid for concentrations expressed in other units. If the available data are expressed in mass units they should be converted before the application of the methodology using the factors given in Table 3. It should also be noted that the correlation for nitrogen oxides converts annual mean nitrogen oxides (NO_x) concentrations to annual mean and short period nitrogen dioxide (NO₂) concentrations.

Application of the Method

Use of the best-fit equations is simple. To calculate short period concentrations, the annual mean concentration is inserted into the equation type specified in the last column of Table 2, together with coefficients b₁ to b₅ as appropriate. The regression coefficient (R²) is an indication of the closeness of fit of the data to the regression curve. If all the data fall on the regression curve, R² will be 1. If the curve explains little of the range of variation of the data, R² will tend towards zero.

Whether the methodology is likely to over or underestimate concentrations in a given area can be assessed by repeating the "test" procedure outlined above using monitoring data from the nearest appropriate Automatic Urban Network or other equivalent site.

The method has been used in other studies and was found to be a straightforward, reliable method for calculating the necessary short period concentrations. It is simple in its application, does not require the purchase of additional expensive modelling packages and yet tests show that it is at least as accurate as dispersion modelling.

References

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A simple spreadsheet to undertake all the above calculations including unit conversion is available, free of charge from Entec by contacting Malcolm Pratt (01606 354848, pratm@entecuk.co.uk) or Gwyn Jones (0207 843 1419, joneg@entecuk.co.uk).

Table 1 Short period statistics determined from measured annual mean data ^a

Pollutant	Short period statistic	Range of over or underestimate
Nitrogen oxides	Annual mean nitrogen dioxide	+15 to -6%
Nitrogen oxides	98th percentile of hourly mean nitrogen dioxide (equivalent to 175 exceedences)	+18 to -13%
Nitrogen oxides	99.8th percentile of hourly mean nitrogen dioxide (equivalent to 18 exceedences)	+21 to -20%
Nitrogen oxides	Maximum 1 hour mean nitrogen dioxide	+72 to -15%
Nitrogen oxides	Number of exceedences of 104.6ppb (nitrogen dioxide) as the 1 hour mean	+1200 to -29%^b
Nitrogen oxides	Maximum 24 hour nitrogen dioxide	+51 to -28%
Carbon monoxide	Maximum 1 hour mean	+45 to -31%
Carbon monoxide	Maximum 8 hour running mean	+55 to -36%
Sulphur dioxide	99.9th percentile of 15 minute mean (equivalent to 35 exceedences)	No monitoring data available including 15 minute means
Sulphur dioxide	Maximum 15 minute mean	No monitoring data available including 15 minute means
Sulphur dioxide	98th percentile of daily mean (equivalent to 7 exceedences)	+35 to +16%
Sulphur dioxide	Maximum 24 hour mean	+114 to +30
PM₁₀	90th percentile of 24 hour means (equivalent to 35 exceedences)	+4 to -3%
PM ₁₀	94th percentile of 24 hour means (equivalent to 20 exceedences) ^c	+3 to -8%
PM ₁₀	98th percentile of 24 hour means (equivalent to 7 exceedences) ^c	+19 to -8%
PM ₁₀	99th percentile of 24 hour means (equivalent to 4 exceedences) ^c	+31 to -15%
PM ₁₀	99.7th percentile of 24 hour means (equivalent to 1 exceedence) ^c	+31 to -7%
PM ₁₀	99th percentile of daily maximum running 24 hour means equivalent to 4 exceedences)	+16 to -10%
PM ₁₀	Maximum running 24 hour mean	+22 to -7%
PM₁₀	Number of exceedences of 50 µg/m³ as the 24 hour mean	+30 to -15%

Notes

- a Those statistics in **bold** represent the objectives included in the January 2000 Air Quality Strategy
- b The range of under or overestimate as a percentage is large for this statistic since it relates to the number of exceedences occurring. Where the numbers are small (e.g. 1 exceedence) any small overestimate (e.g. 10 exceedences) results in a large percentage overestimate.
- c These statistics represent the TEOM equivalent concentrations to the gravimetric values given in the EU daughter directive for 2005 and 2010.

Table 2 Best Fit Equation Coefficients

Annual mean concentration	Units	Short period or other statistic	Coefficients				
			b ₁	b ₂	b ₃	R ²	Equation type
Nitrogen Oxides	ppb	Nitrogen dioxide					
		Annual mean	1.0741	-0.1581		0.999	E
		98th percentile of 1 hour means (equivalent to 175 exceedences)	1.4005	-0.0080	1.57E-5	0.972	A
		99.8th percentile of 1 hour means (equivalent to 18 exceedences)^b	12.8365	0.4604		0.746	B
		Maximum 1 hour mean	3.6452	-0.0203	3.90E-5	0.872	A
		Number of exceedances of 104.6ppb as the 1 hour mean^b	-9.1033	0.3079	0.0007	0.462	F
		Maximum 24 hour mean	8.6226	0.5110		0.688	B
Carbon monoxide	ppm	Carbon monoxide					
		Maximum 1 hour mean	14.9898	-3.9233	0.4148	0.909	A
		Maximum 8 hour running mean	10.4244	-2.4052	0.2288	0.902	A
Sulphur dioxide ^a	ppb	Sulphur dioxide					
		99.9th percentile of 15 minute means (equivalent to 35 exceedences)	13.6818			0.941	C
		Maximum 15 minute mean	39.3111	-1.7866	0.0426	0.925	A
		98th percentile of daily means (equivalent to 7 exceedences)	3.5733	-0.0112		0.9701	D
		Maximum 24 hour mean	7.5146	-0.0445		0.931	D
PM ₁₀	µg/m ³	PM ₁₀					
		90th percentile of 24 hour means (equivalent to 35 exceedences)^b	1.4991	1.0281		0.931	B
		94th percentile of 24 hour means (equivalent to 20 exceedences) ^b	1.7898	1.0131		0.851	B
		98th percentile of 24 hour means (equivalent to 7 exceedences) ^b	1.8961	1.0752		0.743	B
		99th percentile of 24 hour means (equivalent to 4 exceedences) ^b	1.8133	1.1261		0.647	B
		99.7th percentile of 24 hour means (equivalent to 1 exceedence) ^b	2.0925	1.1339		0.393	B
		99th percentile of daily maximum running 24 hour means (equivalent to 4 exceedences)	1.8213	-0.3372		0.999	E
		Maximum running 24 hour mean	2.2911	-0.6220		0.996	E
		Number of exceedences of 50µg/m³ as the 24 hour mean^b	14.1699	-2.5723	0.1069	0.795	F

Notes

- a Unfortunately the correlations for the new sulphur dioxide objectives are not yet available.
b These equation coefficients were not included in document BAA/818, they were derived subsequently.
The statistics in **bold** represent the objectives included in the January 2000 Air Quality Strategy.

Form of best-fit equations

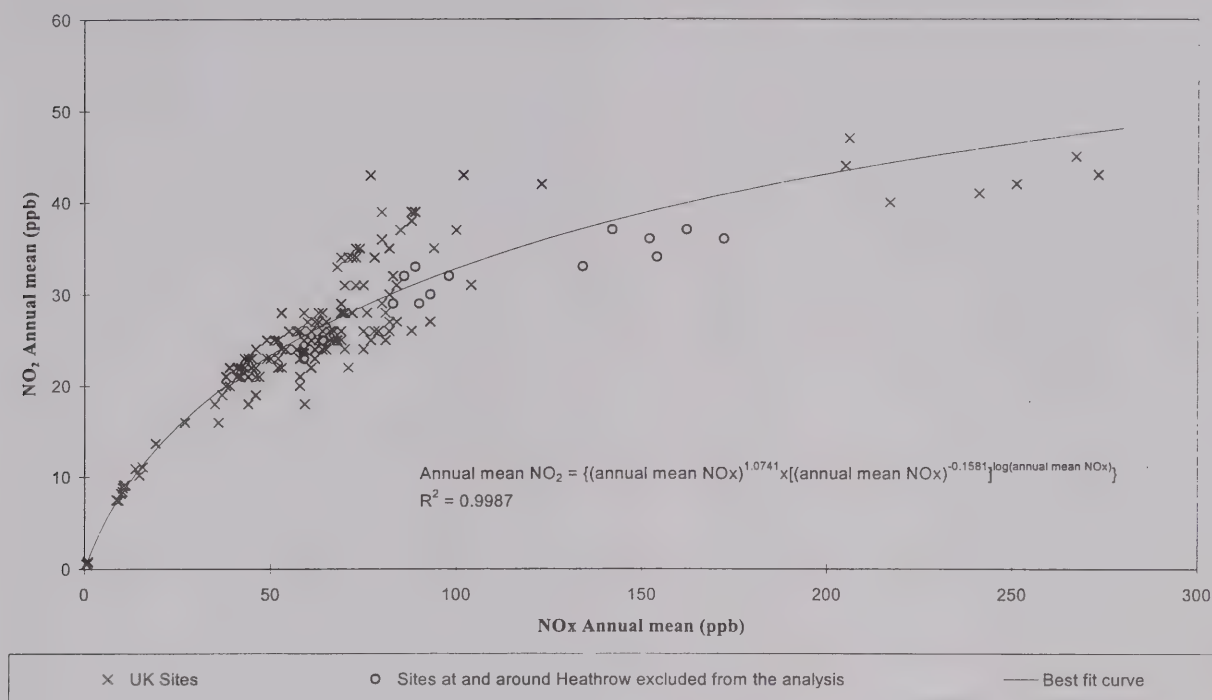
- A [short period statistic] = {[b₁*(annual mean)] + [b₂*(annual mean)²] + [b₃*(annual mean)³]}
- B [short period statistic] = [b₁*(annual mean)b²]
- C [short period statistic] = [b₁*(annual mean)]
- D [short period statistic] = {[b₁*(annual mean)] + [b₂*(annual mean)²]}
- E [short period statistic] = {(annual mean)^{b1}*[(annual mean)^{b2}]^{log(annual mean)}}
- F [short period statistic] = [b₁ + b₂(annual mean) + b₃(annual mean)²]

Example

(Annual mean NO_x) = {(annual mean NO_x)^{1.0741} x [(annual mean NO_x)^{-0.1581-0.1581}]^{log(annual mean NO_x)}}

Table 3 Unit Conversions

Pollutant	ppb to µg/m ³ multiply by	µg/m ³ to ppb multiply by
Nitrogen dioxide	1.91	0.52
Carbon monoxide	1.16	0.86
Sulphur dioxide	2.66	0.37

Figure 1 NO₂ Annual mean regression with annual mean NO_x concentration for 1973-1996

Benzene, Particulate Matter And Associated Priority Pollutants In Renfrewshire, Scotland – Experience From Enhancing Local Air Quality Monitoring

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To support the first stage air quality review of Renfrewshire, a collaborative research project between the University of Paisley and Renfrewshire Council was established to develop a monitoring programme for benzene, particulate matter, lead and polycyclic aromatic hydrocarbons (PAHs). Generally, the district complied with target air quality levels. In the case of benzene a diffusion-based monitoring network highlighted the significance of vehicle movement and the broader impact of a significant traffic intervention event on air quality. Gravimetrically determined particle levels (PM₁₀, PM_{2.5}, TSP), and those of associated pollutants, varied widely at sites studied, and included potential exceedences of PM₁₀ standards. Some variation in the data was attributed to the varied influence of vehicle and natural background sources in response to environmental factors.

Background and Introduction

This article summarises the results and preliminary conclusions from a three-year, collaborative research project, jointly between the University of Paisley and Renfrewshire Council during the period October 1995 to July 1998. The aim of the project was to enhance the monitoring of local air quality in the district, focussing on the priority pollutants: benzene, fine particles (mainly PM₁₀), and particle-associated lead and polycyclic aromatic hydrocarbons (PAHs). The data was then used in the first stage review and assessment of local air quality (DETR 1997, 1998a, 1998b).

A further aim of the work was to assess the applicability of a range of monitoring techniques for the various pollutants and also to generate baseline data directly comparable, where possible, to other studies. A detailed assessment of a number of other atmospheric components was also undertaken and forms part of a PhD thesis being submitted by one of us (RM).

The Renfrewshire District area has a population of over 178,000 inhabitants and is one of the most densely populated areas in Scotland. Its environment shows a great contrast and includes lowlands, highlands, lochs and glens, industrial towns, villages and growing residential areas (Figure 1). It is served by both major and minor roads (including the M8) and is home to Glasgow Airport, Scotland's major international airport. Major industry encompasses engineering, computer manufacture, electronics, food and drink and service industries. Agriculture is still an important part of the economy, with a high proportion of arable land and there are extensive areas of unspoilt countryside.

This diversity presents a considerable challenge to any comprehensive survey of even a minor suite of air quality parameters. In establishing the sampling programme for this study, we were aware of the need to compromise the objectives of an ideal location with those of practicality (sampling access, equipment security etc). The sites chosen comply as closely as possible with recommendations to local authorities during the first stage review period (Bower, 1997; DETR, 1998b).

Materials and Methods

Sample location and the range of samples collected are summarised in Figure 1 and Table 1. The collection and analysis of each parameter complied with or were directly comparable to standard methods (DETR, 1998b) and are briefly summarised below.

Benzene

Ten locations across the district were chosen for the location of passive, diffusion tube samplers containing an appropriate sorbent material (C106 or T-TA). The tubes were exposed for a period of up to one month, retrieved and subject to thermal desorption (ATD-400, Perkin Elmer) prior to detection and quantification by gc-ms (HP5890 gc coupled to HP5971A mass selective detector). Two intercomparison exercises, carried out with Glasgow Scientific Services provided acceptable agreement for co-located sampling tubes.

Particulate Matter

Atmospheric particulate concentrations were assessed gravimetrically using a Partisol 2000 sampling system the hub connected to three satellite units. The four sampling heads were configured for: PM_{10} (x2); $PM_{2.5}$ (x1) and total suspended particulate matter (TSP) (x1). Three locations were selected, two in central Paisley and one in Lochwinnoch, a small village in rural Renfrewshire, out with the District smoke control zone (Figure 1). The samplers were supplied by the ETI Group, Cheltenham and all sampling heads complied with US-EPA protocols. A flow rate of 16.7 L/min was used to deposit particulate matter on 47 mm diameter glass fibre or p.t.f.e. coated filters over a 24 hour period (00:00-23:59, daily). The different filter media were used to allow alternative post collection treatment for inorganic or organic pollutants.

Samples were collected during a four to five month period at each location. The sampler was programmed to cycle

through the PM_{10} , $PM_{2.5}$ and TSP heads on a regular basis. Whilst continuous and simultaneous sampling for each size fraction at all locations was not possible, the collection protocol used provided a reasonable number of samples to allow comparison between sites and size fractions.

The use of gravimetric systems and their potential limitations in terms of continuous monitoring for particulate matter has been debated (QUARG, 1996, Laxen, 1998). In this context no one approach is without criticism, indeed, there is also some concern that the UK reference method using the TEOM system may induce an underestimate of ultra-fine fractions ($<2.1 \mu m$).

However, the main advantage of the method used in this work was that a time-integrated sample was available for further characterisation (examples are detailed below). Lead (and other inorganic components not reported here), were determined primarily on PM_{10} with PAH concentrations determined primarily on $PM_{2.5}$ and TSP fractions.

Particle-Associated Pollutants

a. Lead

Exposed filter material was treated with a mixture of $HNO_3/HF/HClO_4$ and digested in an industrial microwave unit (Milestone Mega 1000), prior to analysis for lead using graphite furnace atomic absorption spectrometry (GF-AAS) (Perkin Elmer 2100). Due to the low level of lead in many samples particular attention was paid to blank levels in filters and reagents. A low measurable but consistent blank was subtracted from sample lead content. The method was partially validated by analysis of reference materials (SRM1648, NIST, USA). Results were in good agreement with certified values.

b. Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are a complex group of cyclic organic compounds produced in significant amounts during the combustion of fossil fuels and other biological materials. Their environmental behaviour and reactivity is closely related to their structure (Smith & Harrison, 1998). PAHs were identified as priority air pollutants in initial guidance and are currently being reviewed (DETR, 1999a,b,c), with recommendations for PAH air quality standards only very recently published (QUARG, 1999). In the absence of any direct indication as to which of the compounds should be measured, it was decided to focus on the 16 parent PAHs specified by the US-EPA (Smith & Harrison, 1998). A summary of their key characteristics is given in Table 2. Recent guidelines for PAH air quality standards focus on benzo(a)pyrene (B(a)P) as a target compound. A recommended annual average of 0.25 ng/m^3 total (particle + vapour) B(a)P has been suggested. However, the panel noted the considerable uncertainty associated with exposure and health risk assessments for PAHs and that broader and more detailed routine monitoring is required.

PAHs have been shown to occur in the fine fraction of ambient aerosols with a mean particle diameter of $0.26\text{--}0.42 \mu m$ (Scheele et al, 1996). The size distribution being influenced by age of the particulate material and climatic

conditions (Aceves & Grimalt, 1993). Urban areas, in general, are primarily influenced by motor vehicles and these areas show the highest levels of PAHs (Neilsen et al, 1996; Chen et al 1997).

A number of the PAHs have been identified as mutagenic and in diesel exhaust particulate, benzo(a)anthracene, chrysene and benzop(a)pyrene are particularly important (Li et al, 1996). The volatility of the compounds decreases with increasing molecular weight and studies indicate that the particulate concentration of this can account for 26%, 33% and 90% of the total atmospheric PAH concentration (particulate + vapour) respectively (Smith & Harrison, 1996; QUARG, 1996).

Due to the wide range of volatility and chemical reactivity, sampling and analysis of PAHs by collection of particulate matter is prone to numerous uncertainties (Smith & Harrison, 1998), which include volatilisation from and reaction on filter media, high blank levels and losses during storage. However, it was considered that the measurement of PAH concentrations on trapped particulate matter, treated in an appropriate manner, would provide a useful, indicative assessment of the magnitude of PAH impact on air quality in the study area. The data would also be comparable with previous data sets and from on going UK monitoring programmes (DETR, 1999c). In addition, it is the levels associated with particulate matter that would be of greatest concern in risk to human health (HMSO, 1995).

Sample p.t.f.e. filters were stored frozen prior to preparation and equilibrated with an internal standard before microwave extraction using acetone and fractionation on silica gel. The PAH fraction was concentrated on Tenax GR (Perkin Elmer) and loaded into thermal desorption tubes. The samples were desorbed and analysed using the ATD-gc-ms system described above. Quantification was based on both internal standard and external calibration and compound identification confirmed using computerised databases. Results are presented in terms of a mean daily concentration in the atmosphere.

PAH measurements were made on samples from the Piazza Centre, Paisley and Lochwinoch, Renfrewshire. Only samples from the Piazza Centre, Paisley gave quantifiable levels.

Results

Benzene

Levels observed at Paisley and non-Paisley sites are summarised in Figure 2. A wide variation is obvious, as are the fluctuations on a monthly basis. Generally sites in urban centres of Paisley, Renfrew and Johnstone give rise to the highest readings. They show a general decrease over the monitoring period. Initially, monthly average levels of between 2 and 4.5 ppb v/v are observed and these fall to average levels of less than 1 ppb v/v towards the end of the monitoring period, ensuring that the sites meet the air quality standard. This decrease is in line with observations from other urban centres (Dollard et al, 1995; DETR, 1999c), which show decreases in monthly averaged levels over the summer months. Such a decrease is likely to be due to

seasonal changes (increase in temperature and sunlight) promoting increased dispersal and photo-oxidative removal of the benzene. The monthly averages compare well with sites in towns of similar size and vehicle movements.

During the study period, the centre of Paisley was pedestrianised. This occurred on 7 September 1997. Traffic flow past the kerbside locations (HSP, GSP) was reduced to nil and other roads (CWP) were subject to vehicle restrictions (buses and taxis and commercial access). Other road users were directed to circular routes, by-passing the town centre. The impact of this can be seen in Figure 3. Detailed interpretation is not possible with this data set, but by presenting data as a moving average ($n=3$), plots for locations monitored during the study, give a "smoothed" time series, emphasising step changes in trends. The relatively unaffected kerbside and urban background locations from outside Paisley (HSR, PPL, SRB), exhibit the expected winter maxima and summer minima. Without changes to traffic flow in Paisley, a similar trend would be expected, possibly with a higher amplitude of variation. However, both kerbside (HSP, GSP) and urban background (OSP) sites show a marked decrease in levels and reduction in the general fluctuation of the monthly averages, after re-organisation of traffic flow. The significant impact of vehicle movement on levels at an urban background site (OSP), relatively removed from dominant emission sources, is rather surprising and highlights the broader, spatial consequences of urban management on air quality, even in relatively small urban areas.

Particulate Matter

A summary of data collected from three locations in Renfrewshire is presented in Table 3. Complete time-series comparisons between sites are not possible, as the data produced were not collected simultaneously. However, PM_{10} levels do fluctuate considerably at all sites and in a number of instances are close to suggested gravimetrically determined air quality limits (QUARG, 1996) and are comparable to levels from other sites in the UK (DETR, 1999c).

The relationship between the size fractions has been shown to exhibit seasonal fluctuations in addition to a strong vehicle influence, for many urban centres (QUARG, 1996). It would therefore be reasonable to assume that a mixture of vehicular and natural background sources would influence the levels observed. For the two sites in Central Paisley, comparison between PM_{10} , $PM_{2.5}$ and TSP values, shows that the temporal variation is considerable. However, at the rural site, less variation is apparent. Considering the mean and range of PM levels, it would appear that the PM at the urban sites is dominated by fine particulate matter and that $PM_{2.5}$ contributes significantly to both PM_{10} and TSP. The levels of these two fine fractions are significantly lower at the rural site, with a higher portion of coarser material in the atmospheric PM. These observations, whilst based on limited data, are entirely consistent with the expected influence of primary vehicle emissions in the urban centre and the significant contribution of erosion-derived material in rural locations.

Particle-Associated Pollutants

a. Lead

The results for lead in particulate fractions are presented in Table 4. Levels are relatively low, well below the $0.5 \mu\text{g}/\text{m}^3$ air quality standard and are only quantifiable in samples from the urban centre sites. The levels found in Renfrewshire are lower than other urban centres during 1996 (eg, Glasgow = $0.052 \mu\text{g}/\text{m}^3$; Central London = $0.074 \mu\text{g}/\text{m}^3$; Leeds = $0.060 \mu\text{g}/\text{m}^3$ (DETR, 1999c)), but of the same order of magnitude. The atmospheric detection limit quoted for the rural location in Lochwinnoch compares favourably with levels determined at Windermere ($0.009 \mu\text{g}/\text{m}^3$) over the same period.

Where lead levels have been determined, there appears to be little variation between size fractions, implying that the majority of the suspended lead is associated with the fine ($\text{PM}_{2.5}$) size fraction and that anthropogenic emissions dominate.

b. PAHs

Table 5 summarises the data for atmospheric particle-bound PAH concentrations in the district on PM_{10} samples from the Piazza Centre, Paisley. The collection period for these samples coincided with the winter period October 1997 - February 1998, when PAH levels in the urban environment are likely to be at their highest (Smith & Harrison, 1998).

Variation in levels determined is quite wide. The influence of climatic factors (temperature, wind speed etc), and the particle number makes a detailed assessment of the distribution of PAHs between vapour and particle phases difficult. Even in examples of detailed studies (Table 2), vapour/particle partitioning can vary between sites by orders of magnitude. However, comparison with data for other sites in Table 5, emphasises the variability of PAH distribution in urban centres. The data from this study, whilst relatively low in concentration terms, are of similar order of magnitude to those measured elsewhere. Some individual PAH compounds, of both low and high molecular weight, do show significant concentrations. The reasons for this are not clear, but could be explained by variations in climatic influences on the vehicle source-term, allowing higher than average levels to be associated with the suspended PM, the data in Table 2 provides some support for this.

The range of values obtained for the target PAH (B(a)P), suggests that daily average particle associated PAH levels do exceed the recommended annual average for total PAHs and when considering that our data are likely to underestimate total PAH concentrations, there may be a need to seek further information before compliance with targets is assured.

At another site (kerbside, 10 m from HSP (Table 2, Figure 1)), we did undertake a separate, limited assessment of vapour phase PAHs (Rowley, 1997) using low-flow personal sampling pumps and Tenax-GR sorbent (Smith & Harrison, 1998), analysed as above. Over a 1 week period in March 1997, vapour-phase levels for naphthalene were found to

range between 47 and 62 ppb v/v, for 1-8 hour samples collected between 09:00 and 17:00. The values appear reasonable for the site in question (DETR, 1999).

The data for Manchester in Table 5 show total PAH (vapour+particle). Compared to these values, the relatively high values for some PAH compounds found associated with PM in Paisley seem reasonable. We are currently assessing the relationships between PAH levels and the significance of likely sources of particulate material, as indicated through stable element composition and environmental factors.

Comparisons with other urban centres in Europe (Smith & Harrison, 1998) suggest that urban winter levels can be 2-5 times summer levels and the levels in urban environments can be 2-3 times those in rural environments. Clearly, based on our data set, the centre of Paisley does not seem to be of particular concern, with respect to future likely air quality standards.

Conclusions

1. For a district such as Renfrewshire, with a diverse range of potential contributions to air quality, the judicious use of relatively cost effective assessment methods is an effective means of increasing the detailed information available for local air quality management.
2. In selecting sampling sites and measurement methods, data can be provided that are of comparable quality to those from established monitoring networks.
3. Studies such as this can provide unique "case study" information on the impacts of traffic management on air quality and also help to evaluate the magnitude of variation of the likely pressures on air quality in relatively small and diverse urban centres.
4. There does not appear to be any cause for concern with respect to the air quality standards for benzene in Renfrewshire. Effective management of traffic distribution and flow is likely to be adequate means of control. However, it is clear that traffic influences on air quality may have a broader, spatial impact than might be expected.
5. If particle levels measured by gravimetric means can be compared to accepted PM_{10} standards (using a modified target level - Laxen, 1998), then PM_{10} levels at the sites studied may exceed the standard on a number of days. Information from $\text{PM}_{2.5}$ and TSP shows that fine particulate matter is important even in relatively small urban centres, but with significant variation occurring on a day to day basis. The urban particulate signature appears to be superimposed on top of the contribution from natural sources.
6. Levels of lead and PAHs associated with suspended particulate matter in the district are low. This does not appear to represent any concern in meeting current and future air quality standards. However, a fuller evaluation of total PAH behaviour in the district may highlight areas close to future air quality limits.

Acknowledgements

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Figure 1: Map of Renfrewshire District. Sampling locations indicated show codes defined in Table 1.

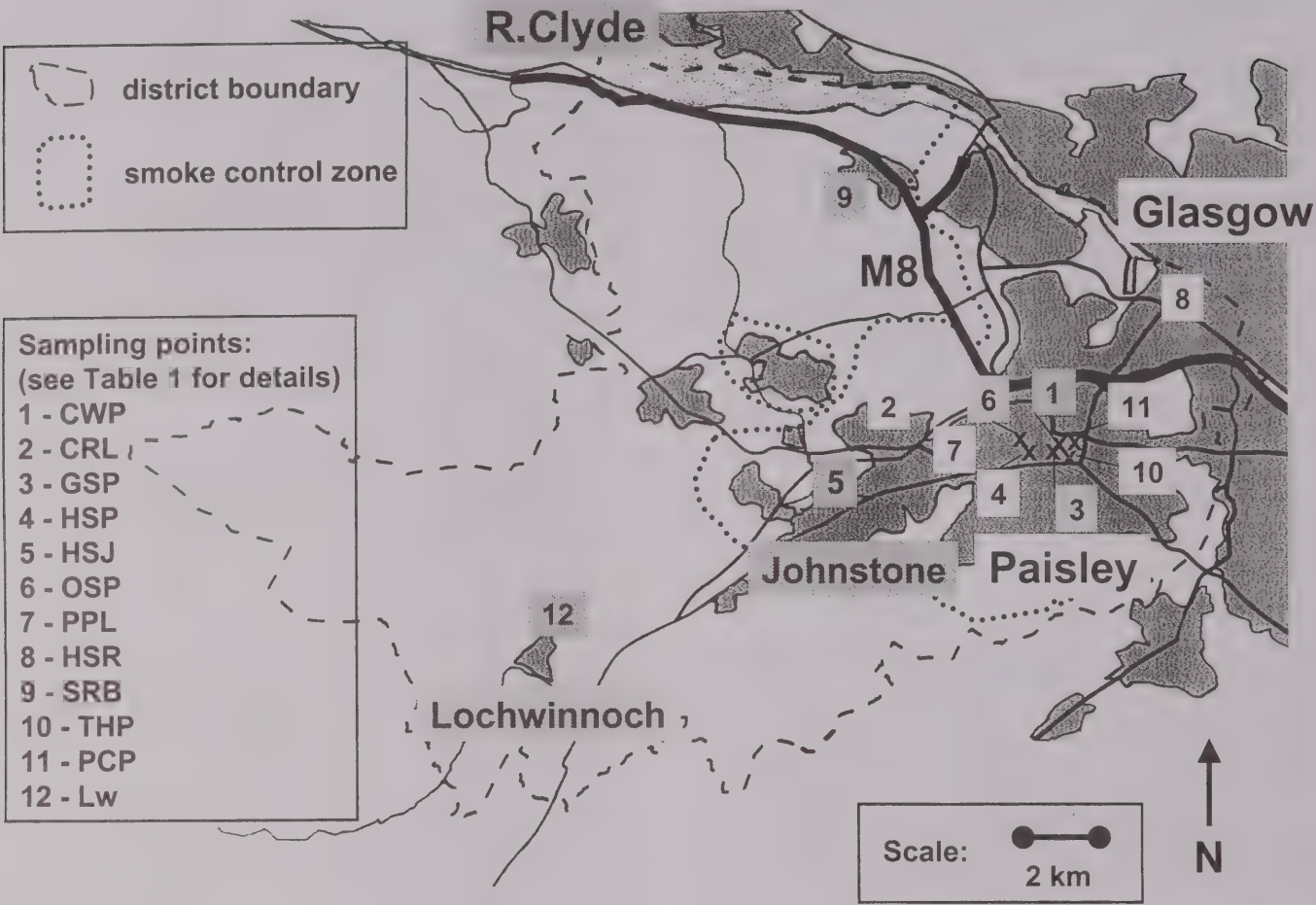
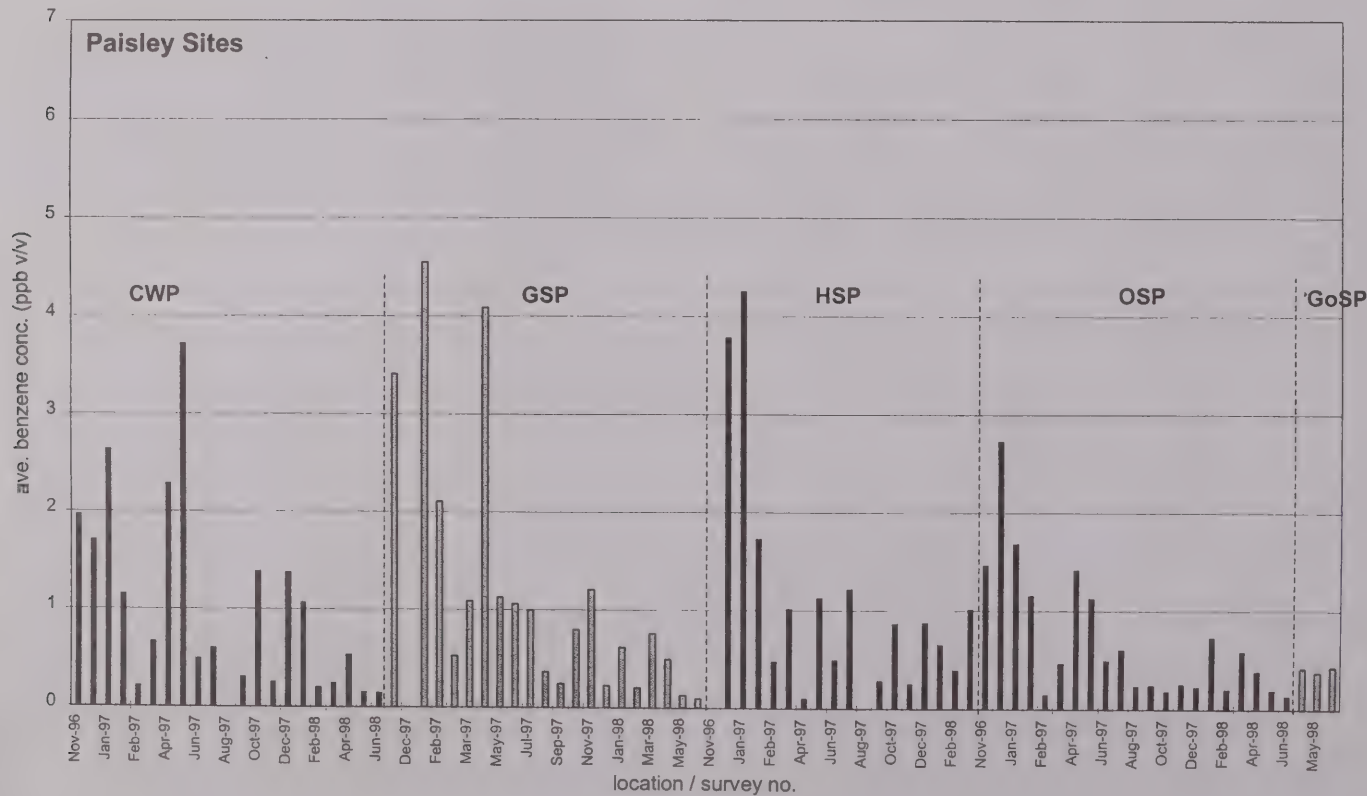


Figure 2: A summary of monthly average benzene levels in Renfrewshire a) Paisley sites, b) non-paisley sites. See Figure 1 and Table 1 for site definition.



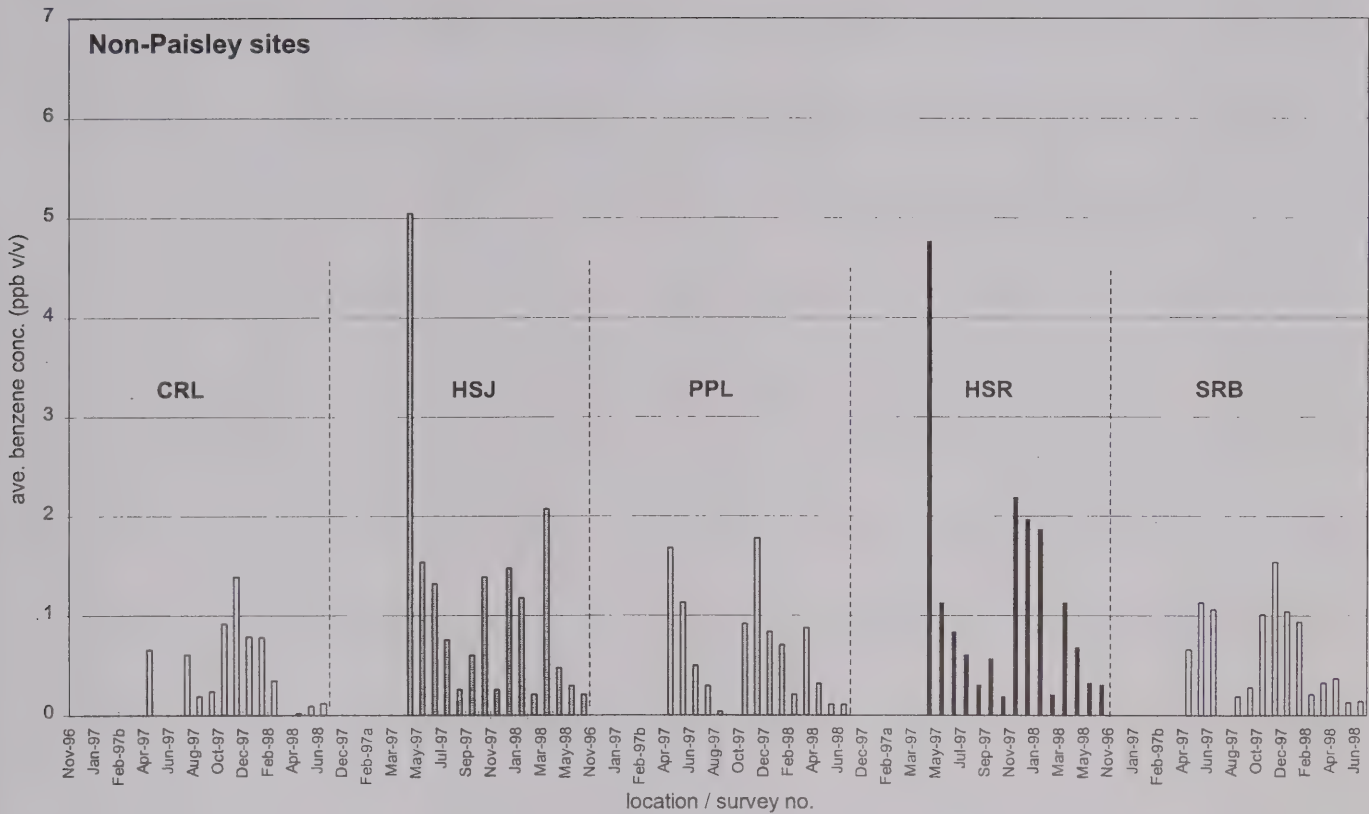


Figure 3: Moving average data for benzene, showing impact of pedestrianisation a) Paisley sites, b) non-Paisley sites. See Figure 1 and Table 1 for site definition.

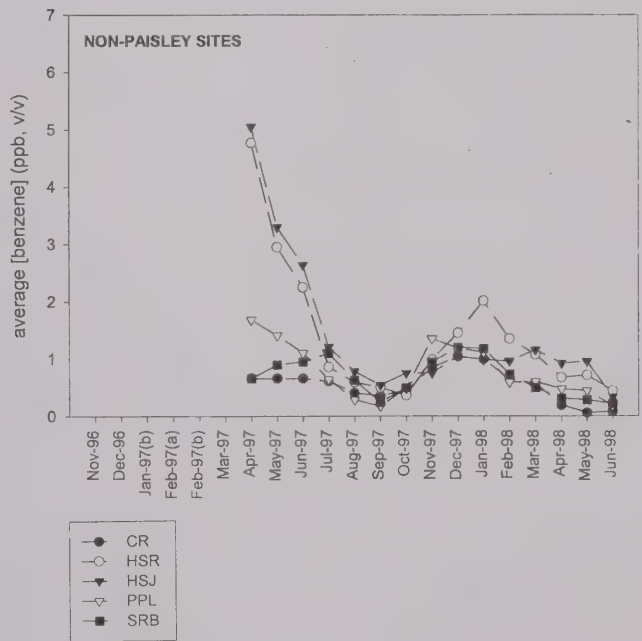
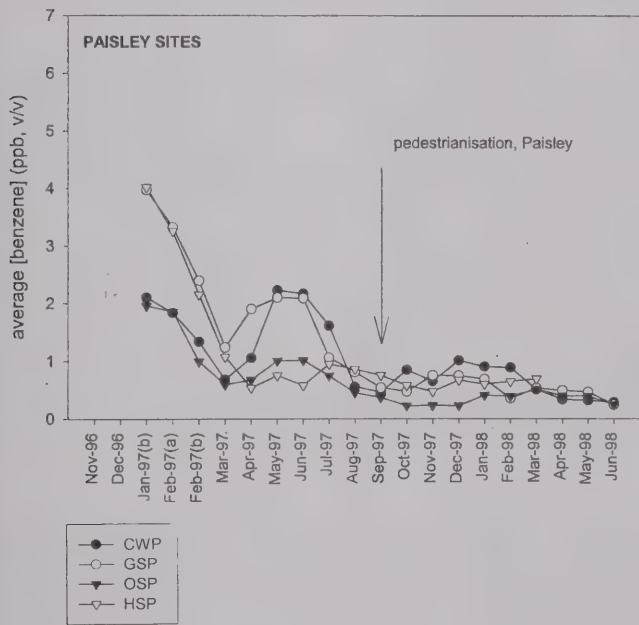


Table 1: Sample locations, parameters and sampling period covered. Codes refer to points marked on Figure 1.

Benzene

Location (code)	Site (definition – DETR, 1998)	Sampling period active type	Number of observations, (% capture)	Comments
Central Way, Paisley (CWP)	Kerbside (U1)	Oct 96 - Jul 98	21 (95%)	
Clippens Road, Linwood (CRL)	Urban Background (U4)	Apr 97 – Jul 98	12 (75%)	
Gilmour Street, Paisley (GSP)	Kerbside (U1)/Urban Centre (U3)	Oct 96 – Jul 98	21 (95%)	Pedestrianised 07/09/97
High Street, Paisley (HSP)	Kerbside (U1)/Urban Centre (U3)	Nov 96 – Apr 98	16 (89%)	Pedestrianised 07/09/97
High Street, Johnstone (HSJ)	Kerbside (U1)	Apr 97 – Jul 98	16 (100%)	
Oakshaw Street, Paisley (OSP)	Urban Background (U4)	Nov 96 – Jul 98	21 (100%)	
Phoenix Park, Linwood (PPL)	Urban Background (U4)	Apr 97 – Jul 98	14 (88%)	
Hairst Street, Renfrew (HSR)	Kerbside (U1)	Apr 97 – Jul 98	15 (94%)	
Station Road, Bishopton (SRB)	Kerbside (U1)	Apr 97 – Jul 98	14 (100%)	

Particulate Matter & Associated Pollutants

Location (code)	Site type	No. PM ₁₀ Survey period	No. PM _{2.5} Survey period	No. TSP Survey period	No PM Observations (Pb, PAH)
Town Hall, Paisley (THP)	Urban Centre	39 22 Mar 97 - 20 Aug 97	16 24 Mar 97 - 1 Aug 97	20 27 Mar 97 - 10 Aug 97	75 (23,28)
Piazza Centre, Paisley (PCP)	Urban Centre	39 25 Oct 97 - 13 Feb 98	17 31 Oct 97 - 14 Feb 98	18 26 Oct 97 - 1 Feb 98	74 (35,27)
Lochwinoch (Lw)	Rural	17 18 Feb 98 - 1 Apr 98	8 25 Feb 98 - 2 Apr 98	10 19 Feb 98 - 31 Mar 98	35 (16,14)

Table 2: The 16 PAHs identified by the USEPA as of concern in air quality monitoring (data from Smith & Harrison, 1998 and QUARG, 1996).

Compound name	PAH EPA No.	Molecular Formula & weight	Boiling point (oC)	Carcinogen O = non + = weak ++ = strong	Examples of Vapour/Particle ratio (atmos concn) London, Birmingham, Manchester
Napthalene	55	C ₁₀ H ₈ , 128	218	O	-, 62, -
Acenaphthylene	77	C ₁₂ H ₈ , 152	270	O	-, 24, -
Fluorene	80	C ₁₃ H ₁₀ , 166	294	O	-, 11.5, -
Acenaphthene	1	C ₁₂ H ₁₀ , 154	279	O	-, 7.4, -
Phenanthrene	81	C ₁₄ H ₁₀ , 178	340	O	46, 20.9, 142
Anthracene	78	C ₁₄ H ₁₀ , 178	340	O	14.7, 10.3, 94
Fluoranthene	39	C ₁₆ H ₁₀ , 202	375	+	3.3, 9.3, 25.7
Pyrene	84	C ₁₆ H ₁₀ , 202	399	O	3.8, 14.8, 13.4
Benz(a)anthracene	72	C ₁₂ H ₁₈ , 228	400	+	0.80, 2.7, 0.5
Chrysene	76	C ₁₈ H ₁₂ , 228	448	+	0.33, 2.0, 0.89
Benzo(b)fluoranthene	74	C ₂₂ H ₁₂ , 252	481	++	0.11,0.10, -
Benzo(k)fluoranthene	75	C ₂₀ H ₁₂ , 252	480	++	0.10, 0.07, 0.01
Benzo(a)pyrene	73	C ₂₀ H ₁₂ , 252	495	+++	0.13, 0.11, -
Dibenz(ah)anthracene	82	C ₂₂ H ₁₄ , 278	524	+	-, 0.05, -
Benzo(ghi)perylene	79	C ₂₂ H ₁₂ , 276	542	+	0.003, 0.03, 0.006
Indeno(1,2,3,cd)pyrene	83	C ₂₂ H ₁₂ , 276	534	+	-, -, -

Table 3: Summary of daily average particle concentrations at 3 sites in Renfrewshire. For locations see Figure 1 and Table 1.

PM₁₀

Location	Site type	Survey period	No. samples	range	average	SD (2σ)
TH	Urban background	22/3/97-20/8/97	39	8.8-64.5	26	12.42
PC	Urban background	25/10/9-13/2/98	39	8.8-64.9	27.1	14.9
Lw	Rural	18/2/98-1/4/98	17	6.5-32.5	19.7	8.6

PM_{2.5}

Location	Site type	Survey period	No. samples	range	average	SD (2σ)
TH	Urban background	24/3/97-1/8/97	16	4.3-54	17.6	12
PC	Urban background	31/10/97-14/2/98	17	4.1-26.8	19.5	10.5
Lw	Rural	25/2/98-2/4/98	8	5-19.8	11.2	5.5

TSP

Location	Site type	Survey period	No. samples	range	average	SD (2σ)
TH	Urban background	27/3/97-10/8/97	20	4.4-56	27.5	12.6
PC	Urban background	26/10/97-1/2/98	18	9.6-85.1	33.5	18.8
Lw	Rural	19/2/98-31/3/98	10	13.4-57.7	33.3	12.7

Table 4: Mean lead concentrations in atmospheric particulate matter (Table 3.), values in ng/m³

Location	Site type	Mean [Pb]PM ₁₀	Mean [Pb]PM _{2.5}	Mean [Pb]TSP	Range (all PM data)	No. obsn (all PM data)
TH	Urban background	0.020	0.021	0.025	0.002-0.041	59
PC	Urban background	0.016	0.021	0.022	0.003-0.047	32
Lw	Rural	ND	ND	ND	<0.007	??

Table 5: Atmospheric PM10-bound PAH's in Central Paisley, October 1997 to February 1998. Values are compared to published data for PAH's in other UK urban centres (# = QUARG, 1996; ** = NETCEN TOMP archive). All values in ng/m³.

Compound	Piazza Centre, Paisley 1997/98 (n=30), mixed PM sizes		Birmingham (particle-bound) (February, 1992, n=27)#	South Kensington, London Annual Average – (particle-bound) #	Manchester 1 week average, Feb. 1992 (particle-bound) #	Middlesbrough Q4-97. Total PAH**	Manchester Q4-97. Total PAH**
	MEAN	RANGE					
Napthalene	-	-	0.21	-	-	-	-
Acenaphthylene	-	-	0.61	-	-	-	-
Fluorene	1.89	ND-7.90	1.1	-	0.50	21.3	29
Acenaphthene	2.53	ND-10.20	1.6	-	ND	2.48	5.1
Phenanthrene	0.90	0.2-4.20	1.1	0.11	0.4	62.3	67
Anthracene	0.93	0.2-4.20	0.4	0.18	0.05	4.28	7.9
Fluoranthene	0.71	0.71-4.30	1.2	0.81	0.63	18.0	18
Pyrene	0.30	0.3-0.78	2.4	0.79	0.8	10.9	14
Benz(a)anthracene	0.08	ND-0.57	0.62	0.79	1.0	2.25	2.3
Chrysene	0.08	ND-0.62	2.2	1.22	1.8	2.70	3.6
Benzo(b)fluoranthene	0.06	ND-0.43	2.0	1.61	2.4	1.43	2.6
Benzo(k)fluoranthene	0.06	ND-0.48	1.1	0.68	2.4	1.48	1.1
Benzo(a)pyrene	0.06	ND-0.33	0.73	1.44	1.6	0.85	2
Dibenz(ah)anthracene	-	-	0.79	0.12	-	-	-
Benzo(ghi)perylene	9.4	ND-12.30	1.9	3.30	3.1	1.93	2.9
Indeno(1,2,3,cd)pyrene	-	-	2.0	1.57	-	-	-

UPDATE

EUROPEAN CAR FREE DAY IN TOWN WITHOUT MY CAR!

The ETA will co-ordinate *In Town Without My Car!* – Britain's participation in the first European wide car free day on Friday 22 September 2000. ETA is inviting towns and cities across Britain to take up the Car Free Day challenge!

The ETA has co-ordinated three annual *National Car-Free Days* in Britain since 1997, the latest on 8 June 1999, and is now gearing up to join its European neighbours in the September 2000 event which will involve closing roads in town and city centres throughout Europe.

This year's initiative follows the success of the *In Town Without My Car* day held on the same day in 1999, when 66 French cities and 92 Italian cities participated. Car-free areas were established in large parts of city centres, enabling people to discover their home town on foot, by bicycle or public transport. Twenty-two million people participated in the campaign, with more than 85 % wishing to see the operation regularly renewed in the future.

ETA will be working with local councils across Britain to show citizens a vision of their town and city centres freed from traffic domination.

Last year Paris closed down some 40 miles of roads, and people simply could not believe how tranquil their cities could be without cars for a few hours. 44% of people said they wanted a car free day every week!

Some Results of the Car Free Day - 22 September 1999

France

Air Quality

Paris (Centre): -30% carbon monoxide (CO); - 5% nitrogen dioxide (NO₂).

Paris suburban town : -39% carbon monoxide ; -19% nitrogen oxide.

Pedestrians / Cyclists

In Chambéry (good weather): +52% pedestrians; +93% cyclists.

In Lille (raining): +142% pedestrians; +382% cyclists.

Public Opinion

- 89% of the French people approved the initiative and 81% wanted the operation to take place in the future in every French city.
- 52% thought that the initiative was effective at combating problems of cars in towns (47% not effective).
- 21% gave up their car on the day.
- 83% in favour of repeating the initiative; 44% once a week.

Italy

Air Quality

Average reductions: -35% in carbon monoxide emissions; -9% nitrogen dioxide; -17% benzene; -14% particulates (PM10).

Rome and Palermo: 60-70% reduction in CO; 50-75% reduction in noise levels in the restricted area.

Public Transport

On average increase in public transport use of 15-20%.

Public Opinion

83% positive about the day; 50% in favour of repeating it during the year; 30% in favour of the permanent closure of historic centres to traffic.

Further Information

A useful colour brochure is available free of charge from ETA, and they will shortly publish a handbook and guidelines for British local authorities wanting to participate in European Car Free Day 2000. If you would like to receive this information, please send an e-mail message to richard@eta.co.uk or phone 0208 946 0912.

MISSING LINKS

The concept of "joined-up Government", both at local and national level, has been with us for several years now, at least in theory. Issues such as Local Agenda 21, Local Air Quality Management and, in all likelihood, the new contaminated land regime, have urged on local authorities the need to break down traditional professional barriers between environmental services and development/planning services. While some authorities have successfully introduced methods for multi-disciplinary "task based" working, many others have struggled to come to grips with this "modernised" approach. One of the central problems has been a lack of understanding, on all sides of the professional barriers, of the common ground which must be addressed in a collaborative way if such issues are to be resolved.

In one area at least, there is help on the way, with the publication by the Health Education Authority of *Making T.H.E. Links*, a guide for local authorities and health authorities on integrating sustainable Transport, Health and Environmental policies. The guide, written jointly by the Department of Health and the Department for Environment, Transport and the Regions (joined up Government indeed), is broken down into three sections. The first deals with the links between transport, health and the environment and provides a very accessible summary of what is often portrayed as a tangled and intangible web of issues. The second section gives an overview of national policy, drawing out the areas where these intersect in, once again, a simple and accessible way. The final section, which rightly forms the majority of the document, looks at

how integration can be carried out, something which is so obviously missing from other pieces of guidance.

Again, the section on implementation is broken down into manageable portions, spelling out the acronym ACTION: Audit and assess policies; Consult and communicate with the public; Target set and share goals; Introduce joint strategies; Organisational changes and the development of multi-agency structures; Nominate key personnel. While the use of such acronyms may seem a little trite, the major areas are covered here and what emerges is a workable and sensible methodology for integrating these important and interrelated policy areas.

What is missing through the document, however, is reference to the structural and procedural changes taking place in local authorities under the Modernising Local Government programme. More importantly, it misses the Community Plans proposed in the Local Government Bill which will, as the 1998 White Paper *In Touch With The People* suggested, provide a focus for all of these policies. To be fair to the authors, however, perhaps this was a link too far.

COMEAP RESPONDS TO GLAISTER

On the day before the launch of the newly updated Air Quality Strategy for England, Scotland, Wales and Northern Ireland, a report on the effect of transport emissions in London was published, and covered in a number of daily newspapers. This report, *Transport and Health in London*, by Stephen Glaister, Dan Graham and Ed Hoskins, commissioned by the London Regional Office of the NHS Executive, caused some consternation in the air quality community with its conclusions that the health effects of air pollution in London were probably

exaggerated and that further spending on traffic management measures on these grounds would not represent good value for money. Many felt that the work was partial and that it had “cherry-picked” statements and conclusions from other reports in order to support its own findings.

On 2 March, the Committee on the Medical Effects of Air Pollutants (COMEAP), the Government’s own advisory panel on health effects, published a response to the Glaister Report. This response robustly defends the position that there is a strong link between air pollution and health and that current levels found in London and other places are having a demonstrable effect. They attacked the authors of the report for choosing “passages [from COMEAP reports] to support their thesis with little regard for the context of our remarks or for our broader conclusions.” It is unfortunate to note that the publication of COMEAP’s statement was given neither extensive coverage in the daily press or implicit Ministerial backing, as was the Glaister Report. The full COMEAP statement is available on the Internet at <http://www.doh.gov.uk/comeap/transport.htm>.

AMMONIA RELEASES

The text and figures of the Building Research Establishment’s Air Pollution Centre Report on *Dispersion of Accidental Releases of Ammonia from Refrigeration Plant* is now available on CD Rom. The CD also contains copies (in pdf format) of the complete set of nearly 100 photographs from the wind tunnel flow visualisation studies of discharges of varying buoyancy around a building that accompanied this work. This work was carried out by Dr. D.J. Hall (Envirobods Ltd) and S. Walker and D.J.B. Butler of BRE. Additional copies are available from BRE – quote BRE Report No. CR407/99.

FORTHCOMING NSCA EVENTS

Thursday 11 May

UK Dispersion Model Users Group

Workshop - London

Wednesday 17 May

Particles and Air Quality

Conference - Royal Society of Arts, London

Tuesday 13 June

The Mobile Phone Network - Health & Planning Issues

Training Seminar - NEC Birmingham

Wednesday 28 June

Public Acceptability of Incineration

Conference - Royal Society of Arts, London

Tuesday 12 September

Noise Update 2000

Training Seminar - NEC Birmingham

Monday 25 to Wednesday 27 September

Annual Conference and Exhibition - Scarborough

Environmental Protection 2000

Tuesday 14 November

Training Seminar - NEC Birmingham

Thursday 23 November

UK Dispersion Model Users Group

Workshop - London

For further details please contact

National Society for Clean Air and Environmental Protection

136 North Street - Brighton BN1 1RG

Tel: 01273 326313 Email: sales@nsca.org.uk Fax: 01273 735802

NSCA National Conferences

Particles and Air Quality

Wednesday 17 May 2000

Royal Society of Arts, London WC1

The understanding of the distribution and associated health effects of atmospheric particles is a rapidly changing field. Two years ago NSCA convened a conference on Particles and Air Quality, to coincide with the report of the Atmospheric Particles Expert Group (APEG). Since then considerable progress has been made in health research, and in monitoring and modelling of fine particles. A new report on air quality standards for particles is expected from the Expert Panel on Air Quality Standards (EPAQS).

This is an opportune time to review the latest scientific understanding of particles, and to consider the implications for national objectives and local air quality management.

The conference will address:

- Air Quality Standards for Particles
- Health Effects
- Modelling Dispersion
- Indoor/Outdoor Exposure
- Air Quality Management Areas
- Developments in Monitoring

Registration Fees: £125.00 + VAT (NSCA members) and £165.00 + VAT (non-members)

Public Acceptability of Incineration

Wednesday 28 June 2000

Royal Society of Arts, London WC1

Proposals for new waste to energy plant are likely to increase in response to changing waste management policies. This conference will address the role of incineration in the waste management hierarchy, public fears about incineration, the process for authorising and approving plant:

- Role of WtE plant in waste management hierarchy
- Environmental assessment of incineration plant
- National policy context
- Public Concerns
- Planning & Authorisation issues
- Health Studies
- Public Consultation

Registration Fees: £145.00 + VAT (NSCA members) and £185.00 + VAT (non-members)

Copies of the brochures for both national conferences are available from NSCA

Tel: 01273 326313 Fax: 01273 735802 Email: sales@nsca.org.uk

clean air

and environmental protection

July/August 2000

the bi-monthly journal of the National Society for Clean Air and Environmental Protection vol.30 no.4

- *Declaring an Air Quality Management Area*
- *Comparison of Roadside and Urban Background PM_{10}*
- *Stimulating Innovation in Environmental Technology*

nsca



Environmental Protection 2000

NSCA Annual Conference & Exhibition

Scarborough, 25-27 September

● Monday Evening

Opening Address and Welcoming Reception

● Tuesday Morning: National Policy Issues

Environmental Issues and the Political Agenda

UK Climate Change Programme – the Social Implications

The Growing Impact of Aviation

Incineration and the National Waste Strategy

Land Contamination – Future Liabilities

● Tuesday Afternoon: Local Environmental Management

Effective Consultation on Community Plans

Local Agenda 21 – Beyond the “Blair Target”

Community Wardens – a Force for Urban Renewal

Implementing the Local Authority Sustainable Development Power

● Wednesday Morning: Industry & Environment

Navigating IPPC and the Planning Process

Industrial Pollution Control – New Challenges for Local Authorities

Integrating Health, Safety and Environmental Management Systems

Integrated Product Policy: Implications for Business

Greening the Supply Chain – Project Acorn

● Wednesday Afternoon: Air Quality

Personal Exposure to Air Pollution – Policy Implications

Indoor Air Pollution – the Healthier Homes Project

In-Car Air Pollution

Local Transport Measures to Tackle Air Pollution

Clean Air for Europe – towards an Action Programme

Integrating Transport, Health and Environmental Policies

Registration Fees: £280 (NSCA members), £360 (non-members); Half day registration £75 (NSCA members), £95 (non-members). All conference fees are subject to VAT, the current rate is 17.5%.

Exhibition Stands: please contact Sally May at NSCA on 01273 326313

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The National Society for Clean Air and Environmental Protection produces information, organises conferences and training events, and campaigns on air pollution, noise and environmental protection issues. Founded in 1899, the Society's work on smoke control led to the Clean Air Acts. More recently NSCA has been influential in developing thinking on integrated pollution control, noise legislation, and air quality management.

NSCA's membership is largely made up of organisations with a direct involvement in environmental protection: industry, local authorities, universities and colleges, professional institutions, environmental consultancies and regulatory agencies. Individual membership is also available to environmental specialists within industry, local authorities, central government, technical, academic and institutional bodies.

Members benefit from joining a unique network of individuals who share an interest in a realistic approach to environmental protection policy; from access to up-to-date and relevant information; from reduced fees at NSCA conferences and training events. They contribute to NSCA's regional and national activities; to environmental policy development; to translating policy into practice; to the Society's wide-ranging educational programmes.

**NATIONAL SOCIETY FOR CLEAN AIR
AND ENVIRONMENTAL PROTECTION
(Founded 1899)**

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Editorial

NSCA ON THE MOVE!

The packing crates are out, the printing press is being dismantled and there's a hint of tension in the air – yes, NSCA is moving offices. The move has, in fact, been on the cards for some time, ever since the current owners of 136 North Street, NatWest Bank, decided not to renew our lease when it expires in 2001. The entire block is being sold for redevelopment, the Bank having moved out in 1998. Following an extensive search, not to say desperate, a new home for the world's oldest national air pollution campaign group was found – Victoria House, 44 Grand Parade, Brighton. A grand name indeed for a medium sized terrace, in need of some care and attention, on the main road into Brighton. However, following renovation work, including the removal of a bath and WC from one of the offices, NSCA will be moving in later this month.

The acquisition of 44 Grand Parade means that we will no longer have to share with a bank, amusement arcade and, latterly, a Christmas squatter shop; it also means we have been able to push forward the modernisation of our internal systems, with the introduction of direct dial telephone numbers and our contacts database. The May/June issue of Clean Air contained a questionnaire for members and subscribers to complete, in order to help us build the database and improve the services we can offer. We are grateful to those who have already returned it and would urge those who haven't to do so as soon as possible. Additional copies are available from Sally May on 01273 326313, or by emailing admin@nsca.org.uk.

The first half of the year has also seen some significant movement in key policy areas. The final round of consultation on the IPPC regulations has finished, in very short order, and we should see them coming into force in the next month or two. Exactly how the new arrangements for the split local authority/Environment Agency enforcement will work out will be revealed over a longer timescale, no doubt. On the local environment front, the new Local Government Bill has been amended so that local authorities will have a duty to prepare Community Strategies and that these will need to have regard to sustainable development. The campaign for a national noise strategy gathers momentum and in debate on the Transport Bill, the Government re-affirmed its commitment to Low Emission Zones, a concept championed by NSCA.

Progress has also been made on some of NSCA's projects providing help and support in the environment field. The project to produce guidance on preparing local authority Air Quality Action Plans started in May, with a view to producing a framework document in October. There will be a follow up, with more detailed guidance and examples of good practice, next year. Also starting in May was the Public Acceptability of Incineration project, looking at the issues of concern surrounding waste to energy plants, due to report in May 2001. Finally, entry forms for the second annual Innovations in Sustainable Development Awards have been sent out to all local authorities. If you think your local authority has been doing good and innovative work in this area, see page 110 for details of the scheme and how to get copies of the forms. And get moving!

New NSCA Leaflet

Light Pollution

Artificial light is essential in our modern society –

- ✱ for illumination of streets, roads and hazardous areas
- ✱ for security lighting
- ✱ to increase hours of use for sports and recreation facilities
- ✱ to enhance the appearance of buildings

There is increasing concern about the problems that light can cause, and excessive lighting is a waste of energy and resources.

Intrusive Light

- ✱ can affect neighbouring properties

Skyglow

- ✱ overpowers the light of stars in the night sky – causing a headache for astronomers, and spoiling the view for the rest of us

NSCA's new Light Pollution Leaflet gives guidance on preventing light pollution and potential remedies to problems with light.

Single copies free

Cost: £8.50/100 £6.00/1000

From: NSCA, Victoria House, 44 Grand Parade, Brighton BN2 2QA

Thanks to the NSCA Scottish Division for compiling this leaflet

NSCA News

"We Are Experiencing Some Turbulence..."

After a stay of 30 years, NSCA is vacating its current offices, 136 North Street, the lease for which expires in 2001. The Society moved to North Street in July 1970, to offices owned by NatWest Bank. The building is being sold for redevelopment as mixed use commercial/residential; the bank vacated in 1998 leaving NSCA as the sole (legal) occupier.

An extensive search of available premises ensued with a number of options being explored. On 5 April contracts were exchanged on Victoria House, 44 Grand Parade, Brighton – a five storey Victorian terrace on the main road into Brighton, not far from the Pavilion. The building had been occupied recently by a number of tenants, both commercial and residential, and was in need of extensive renovation.

The new offices will offer an improved work environment and will include more storage space, something 136 North Street is desperately short of. Renovations will be complete by mid-June and so NSCA will be moving to its new home during the week beginning Monday, 26 June. There will be a



Deputy Secretary, Peter Mitchell (right), at a site meeting with the Site Manager and Site Agent

new phone system, with direct dial numbers and personal voicemail for all staff. Email addresses remain the same.

As with all moves, there will be some disruption, which will necessitate closing the office for 3 days, from 28 to 30 June. We will re-open on Monday, 3 July. The Public Acceptability of Incineration seminar on 28 June will not be affected.

Printing facilities will also be out of action for a period and so the next two issues of *Clean Air* (5 and 6) will be merged. The amalgamated edition will be published in mid September.

All staff at NSCA would like to apologise for any inconvenience caused during the short moving period, and look forward to welcoming you to Victoria House.



Renovation work in progress

Key Details:

New Address: Victoria House
44 Grand Parade
BRIGHTON
BN2 2QA

Closed: 28-30 June, inclusive

Phone: to be advised

Fax: to be advised

email: admin@nsca.org.uk
sales@nsca.org.uk

Next issue of Clean Air:

No. 5/6, published
mid-September 2000.

Cleaner Transport Forum

The Forum is currently overseeing the detailed work programme for a second phase of Low Emission Zone research. An initial trawl of local authorities interested in pursuing LEZ research will be completed in time for the Forum's next meeting in July. The Forum is also developing a proposed banding structure for LEZ emissions criteria. EURO vehicle emission standards represent the simplest set of criteria and, having legal status, could be used for enforcement purposes. However they do not deal directly with retrofit technologies, for which they may need to be related to the Powershift register banding. A final draft is being circulated for comment in June, and the Forum's recommendations to Government agreed at the CTF meeting in July.

A Cleaner Vehicles Programme has been announced in the Budget. Following advice from the Cleaner Vehicles Task Force, a £6M programme of initiatives will be targeted at areas with air quality problems. The Energy Savings Trust will manage the programme, and is likely to be looking for local authorities and transport operators to submit projects, possibly bidding through a challenge fund. The recent launch of the LPG EcoCab (see Members News) was the first example of the programme in action.

Transport Bill

Amendments on air quality management, drafted by NSCA, and tabled by Liberal Democrat transport spokesman Don Foster, were debated during the Committee Stage of the Transport Bill in April. The debate clarified Ministers' views on a number of issues relating to Low Emission Zones and roadside emission testing. Transport minister Keith Hill confirmed his support for the concept of low emission zones, and believes that current legislation gives local authorities sufficient powers to declare LEZs through the use of Traffic Regulation Orders. On the question of resources to fund enforcement, he confirmed that funds raised through congestion charging or workplace parking charges could be used, if this was consistent with the objectives of an authority's Local Transport Plan. On the more difficult issue of enforcement powers, he acknowledged that there was a case for traffic wardens to be given powers to stop vehicles for emission testing, and gave a commitment to consult on widening powers. However, Ministers clearly have some reservations about the possible social equity implications of both LEZs and testing programmes.

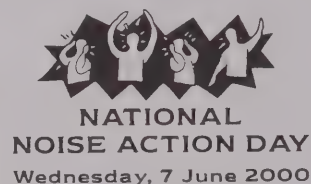
Public Acceptability of Incineration

Work is now progressing on a project investigating public concern about waste to energy (WtE) plant. The research work will be in two main, complementary sections: compiling the necessary technical, scientific and practical information on WtE, and identifying the public's concerns. The outputs of the project (a guide for local authorities and developers, and a booklet for the general public) will - together with case study material - use the former to

address the latter. Focus groups will be formed to obtain detailed information on people's fears and objections and to try to get a better understanding of the public's views

The project is funded by a consortium of local authorities, waste management companies, trade associations and the Environment Agency. More information from Tim Brown at NSCA: tbrown@nsca.org.uk

National Noise Action Day 2000



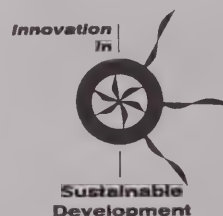
At the time of writing, National Noise Action Day was gearing up to be another resounding success. Nearly 200 local authorities had committed themselves to taking part, along with mediation groups, citizens advice bureaux and other youth and community groups. A London event was to provide a focus for the day with, it was hoped, extensive media coverage.

The NSCA National Noise Survey 2000 is now available from NSCA at £10.00 inclusive of p & p. It looks at local authority implementation of, and attitudes to, current legislation, noise complaints and future policy options for noise control.

For further information contact Mary Stevens at NSCA – email mstevens@nsca.org.uk

Innovation in Sustainable Development 2000

All local authorities have been invited to apply for the Innovation in Sustainable Development Awards 2000. After the success of last year's awards, we are continuing to use the scheme to encourage good practice in local sustainable development among local authorities, with continued support from the UK Petroleum Industry Association.



The categories for 2000 have been chosen to reflect the diversity of work being undertaken in all areas. They are as follows:

1. *Managing the impact of local authority activities*

Good practice in reducing environmental impact. (The size of authority will be taken into account in the assessment of entries in this category.)

2. *Progressing sustainability through partnership*

Examples of local authority working with government/community organisations to progress sustainability.

3. Using sustainable technology

Original and progressive uses of low impact technologies.

Awards will be presented at an event to be arranged in London in December.

Application forms have been sent to all UK local authorities. If you have not received details, please contact Sally May (smay@nsca.org.uk) or Mary Stevens (mstevens@nsca.org.uk).



New Staff

NSCA is happy to welcome two new members of staff to the Brighton office. Aldona Siwicki will be assisting Peter Mitchell with the financial side of our activities, processing publication orders and subscriptions, among other things. Aldona joins us from a car rental agency – poacher turned gamekeeper?

The other new team member is Robin Watson, who is taking on the responsibility for constructing and maintaining our new membership and contacts database – no mean feat if you've ever seen Tim Brown's phone book! Robin, who previously undertook some work for an events company in London, is also assisting, on a temporary basis, the Secretariat of the Environmental Analysis Cooperative, which NSCA took on board last year.

Retirement of Joe Beagle

Joe Beagle, lynchpin of the Society's Greater London and South East Division for more than 20 years, stood down as Secretary of the Division at its Annual General Meeting on 19 May. At a lunchtime reception to mark the occasion, colleagues paid tribute to his indefatigable work for the Society. It is not easy to imagine the GLSE Division without him, but the good news is that he will continue to remain an active and vigorous member both of the Division and of the national organisation.

As Secretary, the baton passes to Rob Gibson from London Borough of Hounslow, who will join the Executive team led by Cllr F. John Smith, and which now includes as Vice-Chairman, Philip Thompson from the City of London, and Linda Davies from APRIL.

Correction – Clean Air No. 3, May-June 2000

Calculating Short Period Concentrations, Table 2 – Best Fit Equation Coefficients - page 92. Please substitute the following.

Form of best-fit equations

- A [short period statistic] = {[b₁ x (annual mean)] + [b₂ x (annual mean)²] + [b₃ x (annual mean)³]}
- B [short period statistic] = [b₁ x (annual mean)^{b₂}]
- C [short period statistic] = [b₁ x (annual mean)]
- D [short period statistic] = {[b₁ x (annual mean)] + [b₂ x (annual mean)²]}
- E [short period statistic] = {(annual mean)^{b₁} x [(annual mean)^{b₂}]^{log(annual mean)}}
- F [short period statistic] = [b₁ + b₂(annual mean) + b₃(annual mean)²]

Example

$$(\text{Annual mean NO}_2) = \{(\text{annual mean NO}_2)^{1.0741} \times [(\text{annual mean NO}_2)^{-0.1581}]^{\log(\text{annual mean NO}_2)}\}$$

REPORTS

Declaring An Air Quality Management Area – Is It An Easy Business?

Nicky Woodfield

Co-Ordinator, Air Quality Management Resource Centre
University Of The West Of England (UWE), Bristol

The outcomes from the recent workshop on declaring air quality management areas (AQMA), held as part of the NSCA Spring Workshop in Daventry were – as perhaps anticipated – the process is clearly challenging, complex and somewhat contentious. Delegates were presented with three scenarios to reflect three different local authority perspectives, circumstances and types, and were asked to consider one of the three scenarios to work on.

The first scenario involved a rural authority *Strawberry Fields District Council* (SFDC), truncated by a motorway, with a quarry, sensitive receptors (housing, schools) and a large scale housing development proposal within an area where the NO₂ annual mean is predicted to exceed.

Apple Blossom Borough Council (ABBC) was the second scenario, and once again represented a rural authority, this time experiencing widespread predicted exceedences of the 15-minute SO₂ objective, encompassing housing, farmland, parkland and Sites of Special Scientific Interest (SSSIs), as well as an area of proposed developments. The third and final scenario involved an imaginary urban authority, *Blackberry Metropolitan Borough Council* (BMBC) which was part of a larger conurbation. Exceedences of both the NO₂ annual mean and the PM₁₀ 24-hour mean were predicted along a motorway section and more specifically in the vicinity of a large motorway junction with residential housing, schools and the proposed expansion of a large scale retail park close by.

With specific modelling and monitoring information provided, delegates were given the task of considering the spatial extent of an AQMA (or AQMA) within the authority. As well as being provided with the area of predicted exceedences, zones of uncertainty (–/+ 1 standard deviation) were also illustrated on the maps provided. Participants were to assume that all the data provided was validated, and the focus of the exercise being to consider the actual and physical process of declaring an AQMA.

More specifically, delegates were asked to consider a number of key issues. What was the spatial extent of any proposed AQMA, with consideration of exposure, receptors, administrative boundaries and natural boundaries? What was the impact of proposed new development on a prospective AQMA, and conversely what

was the potential impact of any prospective AQMA on proposed development? Who should be consulted, and how were property owners within AQMA to be informed and reassured? What further information was needed to inform the designation process, and was there any other mechanism to assist with the process?

To answer the questions posed, delegates first set about drawing lines on maps, and before long a suite of spatially variable AQMA had been established. With no two designated areas the same, the process demonstrated the wide variation in approaches to the task of AQMA designation. One group was unable to derive a single conclusion, and instead chose to provide three different AQMA scenarios for one of the authorities.

Two groups considered SFDC, resulting in four differing approaches to designation, one group considered ABBC, and five groups considered BMBC, which resulted in five quite different approaches again. Results from the exercise are discussed below.

The Importance of Assessing Uncertainty?

Contours were provided illustrating areas of uncertainty in the modelling data used to derive the area of predicted uncertainties (i.e. areas in which air quality was 'almost certain to comply' and 'almost certain to exceed' the objectives). The majority of the groups took the precautionary approach of designating areas of exceedence using the –1 standard deviation (area in which air quality is almost certain to comply). The issue of uncertainty was considered to be a particularly important focus for the process of designation, and needs to be addressed for all tools used to determine locations of predicted AQO exceedences.

Exposure versus Exceedence?

Emerging from the methods adopted in designating AQMA was the notion that although receptors were the general focus for considering exceedences of the air quality objectives, so too were all areas of non-compliance of the objectives. Some AQMA were very specifically clearly derived from detailed consideration of public exposure, with residential properties and schools, for example, being the key focus. Other AQMA covered greater spatial areas, encompassing areas where exceedences were predicted, but where members of the public were not necessarily

exposed, allowing for any future or proposed developments to be duly considered in relation to air quality considerations. This approach was considered more effective in informing the local planning process.

What Makes a Receptor?

The concept of exposure, although recognised as those locations where the public might reasonably be expected to be exposed over relevant time periods, proved somewhat contentious in two of the three scenarios. Residential housing and schools were recognised in each scenario as requiring attention, however the location of a large retail park within an area of predicted exceedence caused some difficulty. Most considered the retail park, due for expansion, to be within an AQMA, whilst a small minority thought the park did not constitute a receptor with respect to exposure of the public to predicted exceedences of the NO₂ annual mean.

Interestingly, the decision to include farmland within an AQMA caused some contention in respect of predicted exceedences of the 15-minute SO₂ objective. Farmers are after all occupationally exposed in their fields, thought some delegates, whilst others weren't so sure.

Where to Draw the Line?

The need to identify the spatial extent of an AQMA by a specific line on a map was in fact questioned. Does the line have to be straight? Can it be a broken line? Must the line follow natural boundaries, administrative boundaries or simply follow the line of the contours derived from modelling predicted exceedences?

One group chose to make use of both unbroken and broken lines, to identify locations where an AQMA could be justified, and locations where designation could not yet be justified. In the latter, more monitoring data was considered necessary to inform the decision-making process, and so a broken line was used to illustrate a potential AQMA pending further work.

In locations where exceedences were predicted along contours spanning residential roads and individual properties, different approaches were taken in identifying the extent of an AQMA. Most groups took the approach of lining AQMA boundaries along residential roads or along development boundaries, whilst one group chose individual properties along which to draw the AQMA boundary, in order to follow an uncertainty contour more precisely.

Ward and Parish administrative boundaries were considered appropriate for identifying an AQMA boundary, particularly where air quality was predicted to exceed objectives over large spatial areas. Field boundaries were also considered as appropriate, and in some locations public footpaths were used to depict AQMA boundaries.

One AQMA or Two?

One scenario featured predicted exceedences of the PM₁₀ 24-hour mean within an area where the NO₂ annual mean was predicted to exceed, and so the issue of how to encompass the two predicted pollutant exceedences arose. Most groups chose to declare one AQMA for the two

pollutants, whilst clearly illustrating the spatial extent of the two predicted pollutant concentration contours on the map. Declaration of one AQMA was considered appropriate so as to simplify the administration of the actual AQMA Order.

In a second scenario, potential areas of exceedences of the 24-hour PM₁₀ objective and NO₂ annual mean objective were identified as being in close proximity to each other, but not necessarily encompassing one another, with two different emission sources giving rise to the different pollutant predicted exceedences. Most groups consequently chose to declare quite separate AQMAs, on the premise that resolving the exceedence problem of one of the two pollutants would mean the revocation of one of the AQMA orders without affecting the other. Resolving the air quality exceedences for one pollutant was considered more likely than resolving two pollutant exceedences together, thereby allowing the two problems to be considered independently.

One proposed AQMA, however, encompassed both sets of exceedences, and the AQMA border was defined as the border to both the PM₁₀ and NO₂ predicted exceedences. This was considered to simplify both administration of the AQMA and the process of consultation with regards to predicted exceedences of the two pollutants.

Proposed Developments in AQMAs?

Certain planned developments within the authority scenarios had an impact on proposals for designating AQMAs. The proposed extension of a retail park in one authority caused one group to propose two different AQMAs on the basis of a *do-something* scenario in the event of the expansion going ahead, and a *do-nothing* scenario in the case of it not going ahead.

In other scenarios, concern was raised with respect to proposed development, and residential housing in particular, being located where exceedences of an AQO were predicted. Proposals for further developments were considered to be affected by any such designation, although the actual designation of an AQMA was not considered to be affected by the location of proposed development.

Consultation, Communication and Collaboration

A number of potential AQMAs within the different authority scenarios transected neighbouring authorities, and the need for collaboration between authorities was considered of paramount importance. Sharing experiences of formally declaring AQMAs is not the only benefit of collaboration: devising air quality action plans (AQAPs) is considered more effective if undertaken together, as part of a regional forum or network.

Consistency between authorities in their approach to designating AQMAs was regarded as particularly important for delivering effective LAQM and for ensuring full public support of the proposals. As a result of discussions, a wide range of potential consultees was considered. They included local resident groups first and foremost, together

with school governors, school PTAs, local businesses, farmers, the Highways Agency, local Parish Councils, and the Chamber of Commerce, Health Authorities in the region, and central government.

For disgruntled residents whose property is located within a proposed AQMA, many of the groups considered the most effective line of communication was to highlight the positive aspects of the local air quality management process - that of improving air quality and therefore the quality of life within the specified area. Equally, it was considered important to highlight that the designation of AQMAs has a temporal dimension, in that a declared AQMA is not static, and can therefore be temporary in nature.

Perceived Problems and Their Potential Solutions

Each workshop group was asked to consider the problem they perceived to be of most concern with regard to actually designating an AQMA, and to give some thought to a solution to the problem. Problems were not difficult to ascertain. One group considered the process to be so problematic that the establishment of a group to consider various concerns was the only way forward!

By far and away the greatest problem was deciding where to draw the line to illustrate a proposed AQMA. There were so many criteria to have regard to, and justifying any such lineation was perceived as problematic. Following natural boundaries and gaining experiences from neighbouring authorities were suggested solutions to this perceived difficulty.

Effective consultation and engaging with local residents within designated areas was perceived as a threat to the effective progress of LAQM, and this was particularly difficult for those authorities with only one officer working to progress the LAQM process. For some authorities, an individual officer may have responsibilities for a number of environmental protection functions, and as such, effective, comprehensive consultation was considered impractical. Involvement with a regional group, and working with various authority planning functions were potential solutions.

Finally, the issue of relevant exposure and decisions to include specific potential receptors was considered difficult, and concern was raised over the overall consistency in the approach to deciding upon relevant receptors.

In Conclusion

From the discussion arising from the exercise, the workshop was successful in demonstrating the varied approaches to declaring AQMAs and the difficulties involved. Delegates rose well to the challenge, and by the end of the afternoon the participants had moved from being officers reporting to their members, to being concerned councillors, irate property owners and anxious parents of school children!

Debate centered on the importance of justifying proposals to designate an AQMA in terms of exposure and assessing uncertainty. All proposals were in fact justified, and the extensive list of derived consultees was indicative of the contentiousness of the process. Consultation and education together were considered most important in ensuring that decision-making fully integrates with other planning functions, and encompasses concerns raised.

Clear lines, as opposed to *fuzzy* boundaries were overwhelmingly used to identify areas for designation, although subsequent discussion highlighted the need to reduce any risk to planning blight and possibility of potential regeneration of brown-field sites being in fact channelled to green field sites. An alternative risk-based approach to the designation process, whereby zones of various degrees of potential 'uncertainty' are the focus for expressing predicted exceedences of the air quality objectives, was put forward.

The exercise clearly demonstrated that there is no one recognised approach to designating an AQMA. The process must involve a wide range of authority planning functions and local stakeholders, and should be portrayed as a constructive process, informing other long term planning processes.

The year ahead is to be, without any doubt, an interesting one.

¹ Air Quality Management Areas: Turning Reviews Into Action; National Society for Clean Air and Environmental Protection (2000).

Nicky Woodfield, Coordinator, Air Quality Management Resource Centre, University of the West of England, Frenchay Campus, Coldharbour Lane, Bristol BS16 1QY. Email: Nicky.Woodfield@uwe.ac.uk

Comparison of Roadside and Urban Background PM₁₀ Measurements from Crawley, West Sussex

Andrew Deacon

University of Brighton School of the Environment

Karl Bock

Crawley Borough Council

Ian Evans

West Sussex County Council

Introduction

There is currently much concern about both the monitoring and the management of airborne particulate matter concentrations in the UK. Much of this debate has centred on the transport of particulate matter over long distances, and the significance of continental Europe as a source of particles. It should not be forgotten however that there may also be a significant contribution to particle loading from local sources, such as major roads and industrial processes. This paper seeks to address some of these issues, and investigates roadside and background sites measuring PM₁₀ in close proximity to one another in the town of Crawley over a three month period from August to October 1998. All PM₁₀ data reported in this paper were measured using TEOM.

TEOM instruments (one fixed site and one mobile trailer) were deployed in the Three Bridges area of Crawley as part of a study of air quality. One site (the East and West Sussex County Councils' mobile unit) was located 2-3 metres from the kerbside of the A220, with the other site (The Crawley Borough Council fixed site) in the residential Furnace Green area of Crawley. Traffic flow past the roadside site was roughly 20,000 vehicles per day, whilst the background site was passed by only a handful of vehicles each day (it is located in a quiet residential cul-de-sac). The two sites are separated by a distance of roughly 1.5 km. In addition to the measurements of PM₁₀, the County mobile unit also collects meteorological data and some gaseous pollutant data.

Previous Roadside PM₁₀ Measurement Studies

Work in central London by Westminster City Council (QUARG, 1997) found that over a three month summer period (July-October) the mean PM₁₀ concentration at the roadside on Oxford Street was 52 µg/m³ compared with 36 µg/m³ at Marylebone Road and 29 µg/m³ at Bloomsbury (all TEOM).

Work in Birmingham compared the A38 to the City Centre AUN site, and found a clear elevation at the roadside (mean 45.5 µg/m³) when compared to the background site (25.4 µg/m³).

The recent APEG report gives results of a number of studies which have compared roadside and background levels of PM₁₀. Their own work at seven kerbside sites in the AURN, found traffic contributions of up to 15 µg/m³ (by comparison of annual means with nearby background sites).

The Group also estimated that over the short term (e.g. daily/hourly) the local contribution from traffic was likely to be higher, as traffic flow, windspeed and atmospheric stability factors may combine to give worst case conditions.

From work on the M25 and M4 motorways, regression analysis carried out between PM₁₀ and traffic flows had found that the annual average background concentration of roughly 20 µg/m³ was increased by about 1 µg/m³ for each 1,000 vehicles per hour.

Results

Parallel hourly data from the two sites for the period from August to October 1998 is shown in Figure 1. There was good correlation between the two sites (*r* = 0.72) over the whole period, perhaps hinting at a common source for the particles. There was an average difference over the whole period between the two sites of 3.9 µg/m³ (using hourly means).

As part of the investigation, two AURN sites were compared with the Crawley data: the A3 roadside located site at a distance of 2.5m from kerb, and passed by 112,000 vehicles per day and Southampton Centre at a distance of 10m from kerb, passed by 25,000 vehicles per day. Figure 2 shows the daily mean PM₁₀ data from all four sites for the whole measurement period. Again, there is a high degree of correlation between the data, with highest concentrations observed at the most heavily trafficked (A3) site. Table 1 gives period mean and daily maximum concentrations for the three month period. Only the A3 site recorded a daily mean in excess of 50 µg/m³, with all sites showing highest concentrations during September, when a particulate episode was reported nationally.

Table 1 Hourly and Maximum 24 Hour Mean PM₁₀ Concentrations

Site	Period Average (Hourly Means)	Maximum 24 Hour Mean
Crawley Background	16.5	35.7
Crawley Roadside	20.4	39
Southampton Centre	19.8	44.9
A3 Roadside	23.1	53

In addition to these TEOM PM₁₀ measurements, there is a particulate sulphate monitor operated as part of the EMEP network at Barcombe Mills in East Sussex. This site is roughly 25 km to the south east of Crawley. APEG (1999) provided a method for converting these sulphate readings (measured as µg sulphur/m³) to secondary PM₁₀.

When the daily mean secondary PM₁₀ data are plotted alongside the TEOM results, again a clear correlation can be observed. Values of r over the 3 month period were 0.69 at the roadside and 0.78 for the background site, with secondary PM₁₀ on average accounting for 49% of TEOM PM₁₀ at the background, and 39% at the roadside.

Conclusions

The results show that PM₁₀ concentrations are elevated at the roadside for much of the time, when compared to nearby background measurements, although the sites studied exhibit similar time series traces. This would seem to indicate a roadside enhancement to a regional PM₁₀ source. This is reinforced by the addition of further sites (both roadside and background), with concentrations close to the busy A3 exhibiting similar time series trends, but again with a further elevation in concentration. The contribution of the road in question to PM₁₀ in Crawley is relatively small (about 20% of total PM₁₀) and this will have implications for air quality management, as local controls would influence only a small part of the overall concentration. The addition of secondary PM₁₀ data to the TEOM readings, further emphasises the regional nature of this pollutant, with

strong time series correlations observed, although the sites are some distance apart.

References

APEG (1999) - Source Apportionment of Airborne Particulate Matter in the United Kingdom.

QUARG (1995) - Urban Air Quality in the United Kingdom, 1st Report of the UK Quality of Urban Air Review Group.

QUARG (1996) - Airborne Particulate matter in the United Kingdom, 3rd Report of the UK Quality of Urban Air Review Group.

Acknowledgements

This paper is based on a presentation given at the ETI TEOM User Group Meeting, Cheltenham, November 1998. The research work of Andrew Deacon is supported by the Sussex Air Quality Steering Group.

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Karl Bock, Crawley Borough Council, Town Hall, The Boulevard, Crawley RH10 1UZ

Ian Evans, West Sussex County Council, County Hall, Chichester PO19 1QJ

Figure 1 Hourly Roadside and Background PM₁₀ in Crawley (August – October 1998)

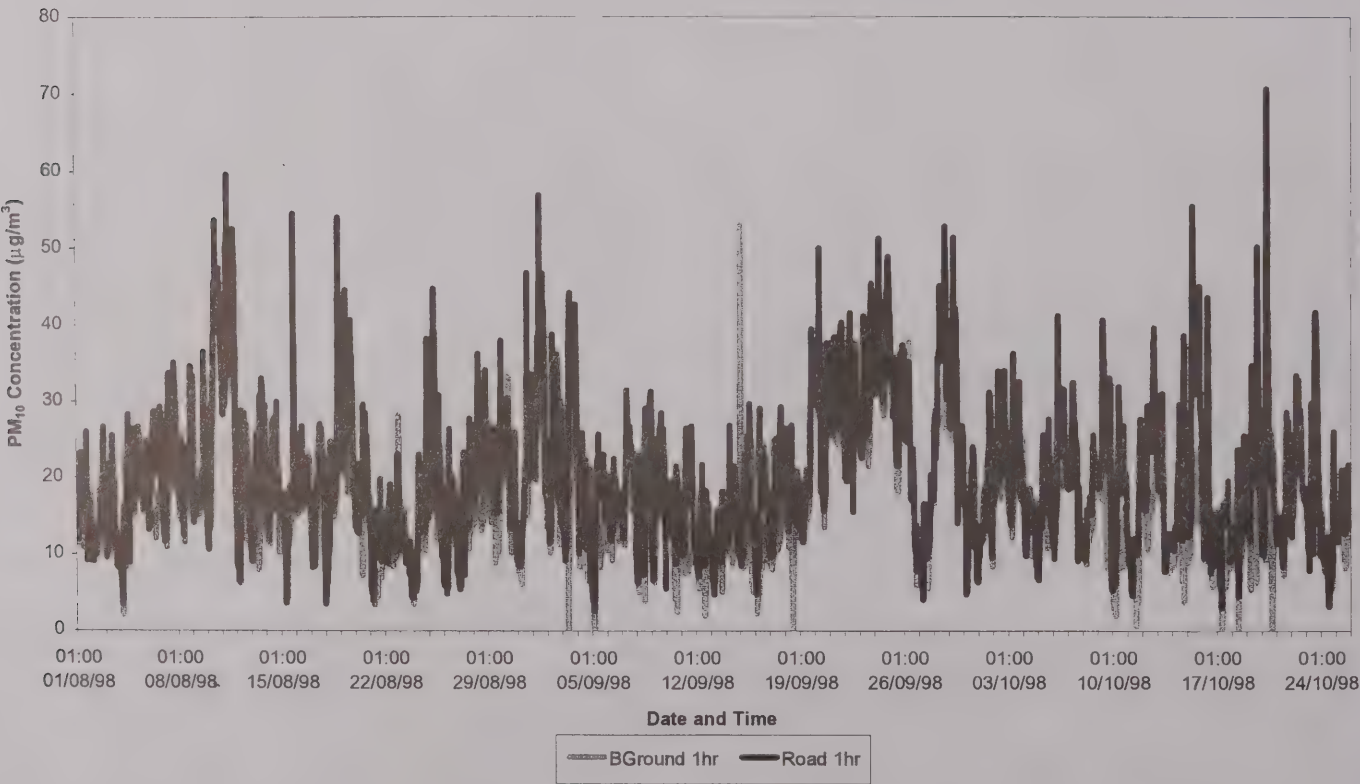


Figure 2 Daily Mean Roadside, Background, Southampton and A3 PM₁₀ (August – October 1998)

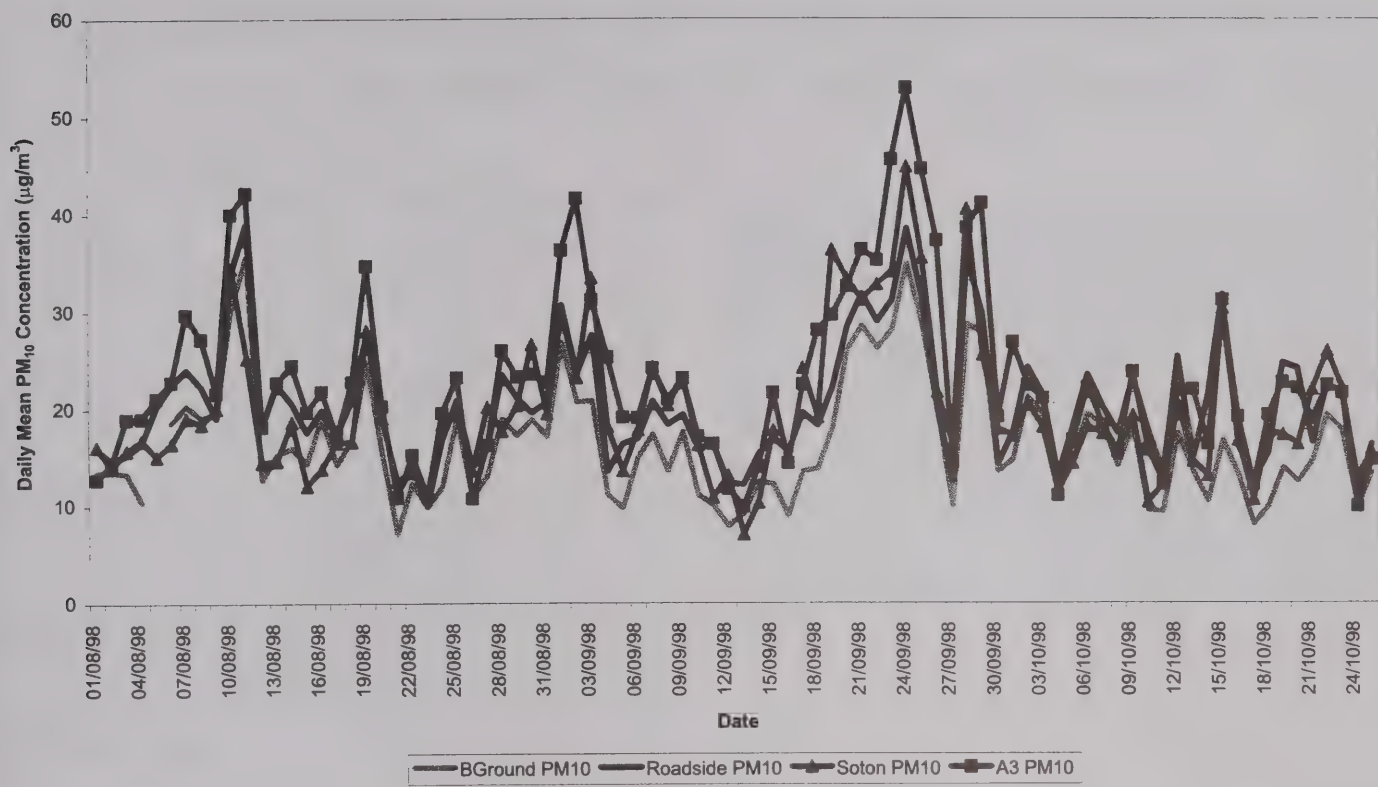
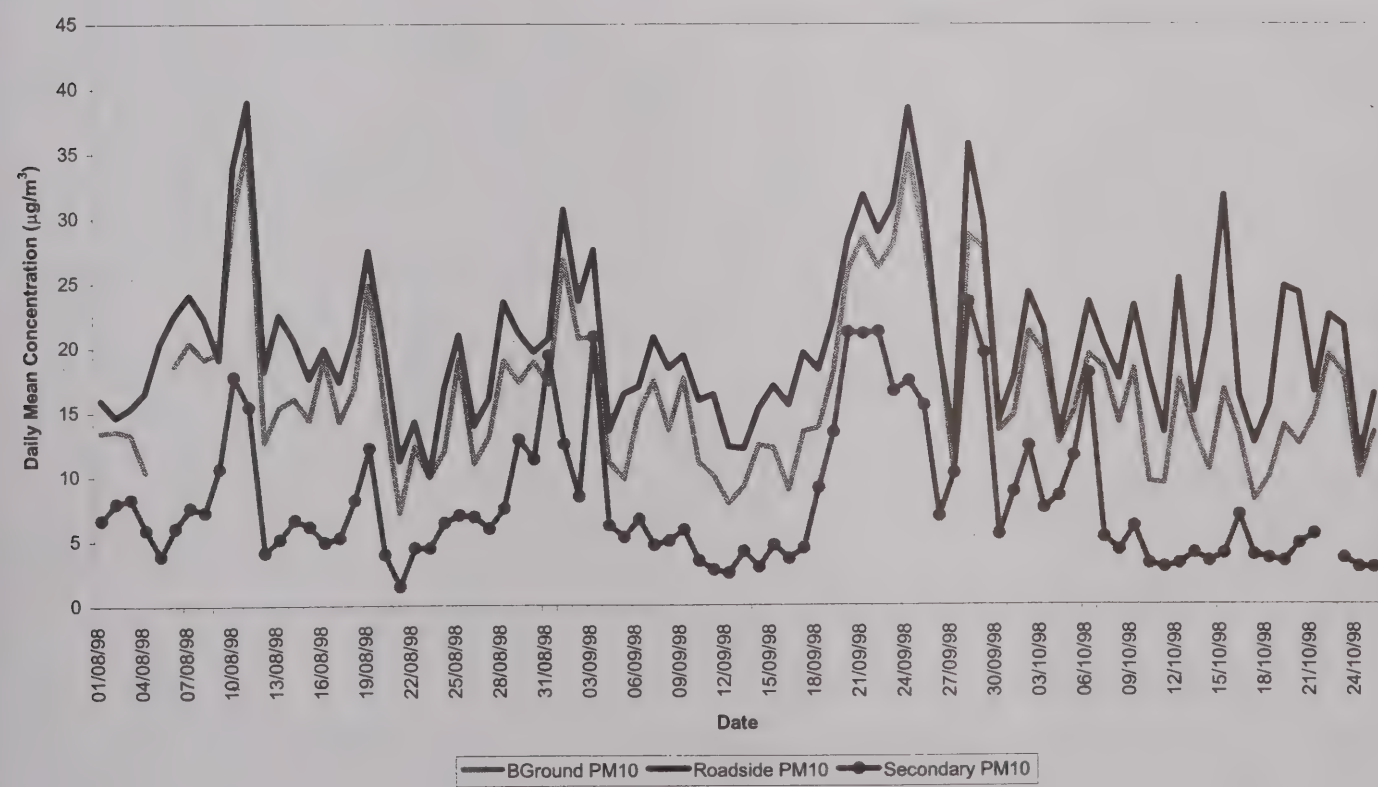


Figure 3 Daily Mean Roadside, Background and Secondary PM₁₀ (August – October 1998)



Cleaning Up?

Stimulating Innovation In Environmental Technology

Parliamentary Office of Science and Technology

Innovation is the key to success in many areas of business, not least in improving environmental performance. Opportunities arise to develop domestic and global markets for industrial processes and consumer products based on meeting customer needs at the same time as improving environmental performance.

POST (Parliamentary Office of Science and Technology) has reviewed industry's responses to environmental pressures and what drives innovation. This note summarises a longer report' on innovation in environmental technology.

What is Innovation?

The key to developing markets in technologies is 'innovation', but this has many meanings. Commonly it is taken to mean the successful exploitation of ideas. Essentially, innovation is about creating change for the good, by creating strong links between the generation and dissemination of knowledge, technical progress and long-term growth in productivity and wealth.

Traditionally, innovation has been regarded as a 'pipeline' in which funds are pumped in at one end and commercial products appear at the other.

However, innovation is now increasingly recognised as a complex process that involves input from governments, academia and industry (and increasingly from other interested parties) at many different stages in the transfer of knowledge. Thus, innovation is increasingly seen as a process of creating *collaborative networks*.

Stemming from this 'network' model of innovation, many now agree that *basic research provides innovators with techniques to solve problems rather than an agenda of ideas ripe for exploitation*.

The commercial opportunities of new technologies (the 'market pull') provide a stronger driver than what is technologically possible (the 'technology push'). This is perhaps particularly the case for innovation based on engineering and physical sciences, such as information technology and process engineering. The reverse is more often the case in the biological sciences, where scientific advances often drive the market (e.g. in genetically modified foods).

Thus, the route by which science can lead to new products is highly complex, and there are no guarantees that increasing expenditure on fundamental research will necessarily lead to commercial success. Therefore, it is now recognised that innovation needs not only investment in research but also that industry needs to play an important role in matching new knowledge with successful development, demonstration, dissemination and marketing. These issues are discussed further in the full report.

Environmental Innovation

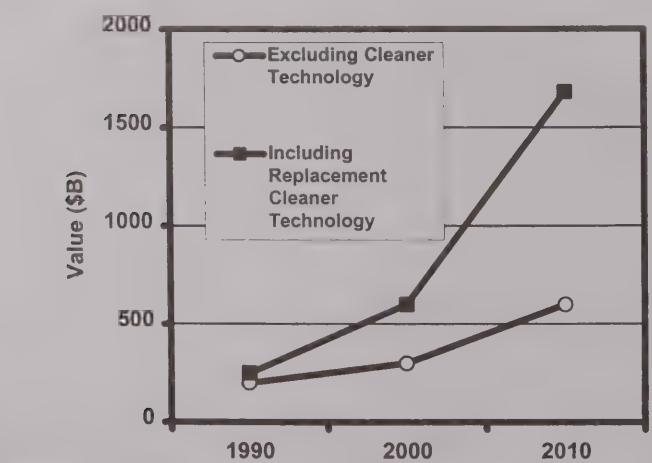
There is a consensus that the most cost-effective way of industry's environmental performance in the medium to long-term is to change the design of products and processes, rather than relying on end-of-pipe technology. This is likely to be achieved with cleaner technologies that minimise the use of raw materials, energy and water, and avoid the production of pollutants' (Figure 2), for example by using approaches such as 'green chemistry'.

Environmental Technology

The environmental technology market is a diffuse grouping of goods and services, loosely held together by the aim of reducing environmental impacts. The market includes 'end-of-pipe' air and water pollution control equipment, monitoring and consulting services. This definition is imprecise, but traditionally excludes so-called 'cleaner' technologies that prevent or minimise the production of pollution at source. The full report provides details of end-of-pipe and cleaner technologies.

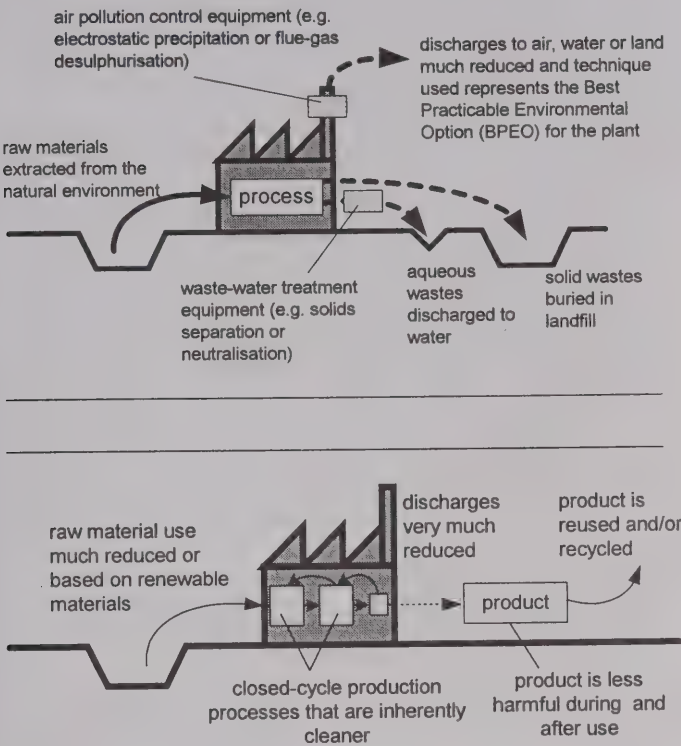
Estimates from the OECD suggest the 'core' environmental technology industry (i.e. mostly 'end-of-pipe' equipment) will be worth \$600 billion globally by 2010. Meanwhile, switching to cleaner technology as plants are replaced would push the figure for the total environmental technology industry to over \$1500 billion (Figure 1). A huge potential for markets in cleaner technologies exists but this is currently not receiving much attention – leading some to suggest that industry is "missing the green wave".

Figure 1 The Value of the Worldwide Environmental Technology Market



Source: OECD

Figure 2 Approaches to Pollution Control



End-of-pipe Clean-up

Cleaner Technology

Source: POST

Drivers

Technological change within industry is influenced by environmental policy. The environmental policy 'tool-box' holds a variety of instruments to realise better environmental quality. These range from technology-based environmental standards, through economic incentives such as pollution taxes, to direct financial incentives such as

R&D subsidies, ending finally with communication and networking tools.

The effectiveness of these tools in bringing about environmental improvement has been studied for many years. The full report points out that no one instrument on its own can stimulate companies to innovate successfully. Rather, a mixture of instruments (and flexibility in the style in which they are implemented) is needed, depending on the specific factors and circumstances of the firms and sectors involved. Also, the policy climate needs to be stable and credible over a protracted period, to minimise risks faced by industry.

Thus, innovation flourishes where regulation is flexible and policies are stable.

Such a context helps companies reduce their costs of compliance and also aids the regulator and government in reducing opposition to environmental policies. Industrial companies can be classified according to one of three 'models' of how they respond to environmental pressures (Table 1). Within each of these models there are four key factors which are widely recognised as important drivers for improving environmental performance:

- Avoiding prosecution for failure to comply with legal requirements
- Realising opportunities for cost-savings related to resource use and waste disposal
- Responding to pressure from customers along the supply chain, including final consumers
- Maintaining company image and competitive advantage.

Table 1 Models of Industry's Technological Responses to the Environment

	'Regulated Industry'	'Greening of Industry' ¹	'Industrial Ecology' ²
Nature of response	Reactive compliance with technology-based standards	Proactive improvement in environmental performance ('compliance-plus')	Increased resource efficiency to provide competitive advantage
Driver for innovation	Regulation	Market opportunities and policy pressures (achieving 'double dividends')	'Framework' policies to encourage market competition (meeting the 'triple bottom line')
Focus of innovation	Pollution abatement ('end-of-pipe' clean-up) and waste management	Process change ('cleaner production')	Novel products and services involving cleaner design and lifecycle thinking
Source of innovation	Equipment suppliers	Environment integrated into the firm's technology strategy	New market entrants provide radical new service packages
Applicability to sector	Mature sectors	Sectors selling to final consumers	Knowledge-based industries
Current position	Most firms	Few firms	Few firms

Notes:

1. Changes to processes occur within individual firms to increase environmental performance and to reduce costs at the same time.
 2. Increased environmental performance is designed into the life cycle of the product: design, manufacture, use and after use.
- Source: based on research undertaken at SPRU, University of Sussex

Barriers

Currently, the ‘Regulated Industry’ model is most widespread (Table 1), despite the availability of cost-effective solutions in many areas that could help firms move to the other models. A number of barriers can be identified, therefore, that may keep companies locked into the ‘Regulated Industry’ model:

- **Financial and Economic Barriers** – such as market failures caused by imperfect information; a mismatch between those paying the costs of installing any efficiency measures and those receiving their benefits; and high costs in finding out about the environmental properties of a device or system. The conventional operation of the market at any time may also inhibit take-up. Thus, certain technologies may not be cost-effective in a particular instance; there may be hidden costs, where technology investments entail extra costs not included in decision-making models; and where financiers may restrict access to capital for certain individuals or organisations (e.g. because they may be high-risk borrowers).
- **Institutional Barriers** – where decisions are not made on the grounds of rational economic self-interest. Examples include cultural ignorance that systematically neglects cross-sectoral, cross-disciplinary and environmental issues; organisational structures that may create incentives for inefficient designs; and the fact that those responsible for environmental management may lack sufficient power within an organisation.
- **Behavioural Barriers** – such as making decisions on the basis of limited information using rules of thumb and routines in situations where, commonly, the goal is to provide a satisfactory solution, rather than an optimum one. People may be resistant to change because they are committed to standard practice. The form and source of information is often as important as cost in determining whether people will take up measures being proposed (e.g. it must relate to their own concerns, and they must trust the source). Lastly, there may be a lack of, or antipathy towards, environmental awareness.

Encouraging Innovation

Laying the Foundations

The consensus surrounding cleaner technology includes the UK Government, which has called for a “green industrial revolution”⁴. The challenge is how to bring this about, thereby moving the bulk of industry towards the ‘Greening of Industry’ and ‘Industrial Ecology’ models in Table 1. The government’s response has been through an approach (‘market transformation’) that works with the market and encourages entrepreneurship. Its objectives include promoting best practice, and supporting research and innovation. Underpinning this will be a framework of information and investment programmes and, where appropriate, regulatory and fiscal measures.

But how should the UK move forward in developing the support for research and innovation necessary to help industry shift to a more sustainable basis? Three key elements are necessary:

- **Strategy** – to define the objectives and scope of innovation required, recognising the need to both ‘get the science right’ and to take full account of the business processes necessary to bring technologies to the market place. This also needs to identify the interested parties involved from government, regulators, research councils, academia, industry, consumers, etc.
- **Coordination** – to ensure that all actors are fulfilling their commitments, are working across traditional boundaries of academic disciplines and business sectors, while at the same time avoiding unnecessary overlap between participants and initiatives.
- **Funding** – the level of funding ought to match the commitment. It does not need to come from one source, however, and a partnership approach is most likely to be successful in delivering the research effectively.

However, it has been suggested by many commentators that defining a mechanism to achieve these objectives, would need to take account of several factors:

- Industry is made up of many disparate parts, comprising firms of many different sizes, often involved in highly complex supply chains in domestic and overseas markets, and with differing levels of managerial and technical competence in this area.
- There are many different manufacturing processes with environmental consequences where a wide range of techniques can improve environmental performance.
- There are many sources of funding for innovation, often with different objectives and mechanisms, aimed at different audiences, and targeted at different phases of the innovation process (from ‘proof of concept’ through to pilot and demonstration projects).

It is important to recognise the inherent complexity in industry. Without a clear understanding of the broad range of factors influencing technology choice in industry, the correct mix of incentives, funding programmes and research mechanisms cannot be determined. Therefore, the opportunity exists for government, industry, academia and others to develop a *coherent strategy for innovation in environmental technology to help develop sustainable industry*.

Towards a New Strategy

There are several possible approaches to defining such a strategy. These include setting up a **Sustainable Technology Task Force** comprising a broad range of members. The Task Force could be established within the Foresight programme. Alternatively, it could form part of the work of the newly created Advisory Committee on Consumer Products and the Environment (ACCPE)⁵. The full report sets out a number of alternative mechanisms, but, whichever mechanism is adopted, the terms of reference for delivering a strategy might include:

Reviewing current and planned activities in this area in the UK and elsewhere (e.g. the UK's major competitors: the USA, Germany and Japan).

Identifying areas of duplication, overlap and omission - including whether separate programmes on sustainable technology should be established, or whether a 'sustainability' element should be integrated within other programmes. On the one hand, a separately funded programme runs the risk that industry and researchers could see sustainable technology as a sideline issue. On the other hand, building the concept into mainstream disciplines and sectors could mean that sustainable technology receives less attention and is not strongly 'championed'. A third alternative is to adopt both approaches and to produce a 'suite' of programmes.

Developing a national framework for innovation in environmental technology, which would:

- Set out the objectives for a framework - e.g. protecting the environment; conserving natural resources; developing and maintaining strong academic and industrial innovation; and enabling industry to compete in global markets for efficient products and process technologies.
- Set out the strategy by identifying the major areas for research, development, demonstration, dissemination and marketing⁶ necessary to ensure the objectives are met - including technological aspects, as well as issues related to economics, management and public policy.
- Promote the means to implement the strategy - taking account of the variety of funding sources; the structure and complexity of industry; the opportunities for enhanced environmental performance throughout industry; the desirability of specific or integrated innovation programmes; and the need to work across boundaries of discipline, sector and country.

In Conclusion

Environmental innovation is increasingly seen as a key to improving the efficiency of industry worldwide. This suggests a new model for industry based on innovative production, products and services that combine increased efficiencies and environmental performance. However, the full report suggests that realising this and the commercial opportunities it represents requires:

- Stable long-term policies for environmental performance and sustainable development.
- A mix of policies to maximise the opportunities for innovation across industry.
- A coordinated and well-resourced national strategy for innovation in sustainable technologies.

Notes

1. *Cleaning Up? Stimulating Innovation in Environmental Technology*. POST Report No. 136, April 2000. Report free to Parliamentarians (contact 020 7219 2840). Available to the public, price £15 + P&P (contact the Parliamentary Bookshop, 020 7219 3890. See also www.parliament.uk/post/home.htm
2. ESRC Global Environmental Change Programme, 28 March 2000.
3. End-of-pipe clean-up techniques will still be necessary though, both within a process, to assist in recycling, recovery and reuse of materials; and for the clean-up of residual waste streams.
4. Speech made by Chris Mullin MP, Parliamentary Under-Secretary of State at the Department of the Environment, Transport and the Regions, at the Environmental Industries Commission Conference, 2 December 1999.
5. Among its terms of reference, ACCPE will focus on "tackling the major environmental impacts of products across their life cycle, taking into account developments at the EU level on integrated product policy".
6. Including domestic and overseas markets in the developed and developing worlds.

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See also www.parliament.uk/post/home.htm

UPDATE

CLEANER CAR MANUFACTURE

A recent report¹ from the Cleaner Vehicles Task Force² outlines how the vehicle manufacturing process affects the environment; the report shows the steps the industry is taking to reduce the environmental impact of conventional methods of vehicle production and disposal and, thus, how it is meeting the challenge of producing strategies for sustainable development. Among the measures being introduced by manufacturers are:

- reducing energy consumption used in manufacturing;
 - using recycled materials in new vehicles;
 - cutting down on waste;
 - designing vehicles that are easier to recycle.
1. *The Environmental Impacts of Motor Manufacturing and Disposal of End of Life Vehicles – Moving Towards Sustainability*. Available from DTI Automotive Directorate, 151 Buckingham Palace Road, London SW1W 9SS. Tel: 020215 5000.
 2. The Cleaner Vehicles Task Force is sponsored by the DETR and DTI. It was set up in 1998 and its members include people from industry, government, environmental and consumer organisations.

Did you know?

Among the many facts highlighted in the Cleaner Vehicles Task Force report, did you know that

- the average age of a vehicle is 14 years;
- approximately 1.9 million vehicles were scrapped in 1997;
- motor vehicles are made up of about 100 systems and sub-systems and anything between 8,000-10,000 different components fitted to the body shell;
- on average each car uses 17 tyres during its lifetime;
- in 1997, around 38 million tyres were scrapped in the UK – about 9 million of these from end of life vehicles;
- lead acid batteries used in cars last 4-5 years before they need to be replaced; 90% of batteries in the UK are recycled.
- in 1997, there were 2,000 licensed or licence-exempt dismantlers ... and 1,500 unlicensed dismantlers.

GREENING LOCAL TRANSPORT

As the deadline for Local Transport Plans fast approaches, Air Quality Review and Assessment is coming to an end and thought is being put into action planning, Richard Evans of the Environmental Transport Association (ETA) reports on two local transport campaigning and awareness raising opportunities. Green Transport Week, which runs

throughout June, offers a chance to raise awareness of transport issues and get local people and businesses involved in the debate. The ETA is also coordinating Britain's participation in European Car Free Day to be held on 22 September. In the last issue of Clean Air (No. 3), we reported on the response to last year's Car Free Day in France and Italy. In this issue we report on ETA's plans and how individuals can get involved in the campaign.

GREEN TRANSPORT WEEK

Green Transport Week has run annually in June since 1993, and the ETA encourages members and others to give up their cars voluntarily for at least one day during the week. This year's dates are from 10-18 June, with a national launch in Rochester (Kent) on Friday 9 June.

Car use is at an all time high in Britain, with daily traffic jams in city centres, damage to our health and loss of our countryside under tarmac as the roads programme resumes. In some parts of the country the bus is an endangered species, and there are fears that we'll soon see more Beeching-style closures of the railways.

As a proportion of distance travelled, the car accounts for 81%, walking 3%, and cycling just 0.5%. The car is used for increasingly short journeys: 24% of all car journeys are under two miles and 58% are less than 5 miles. And, of course, as the roads get busier, the greenest modes - walking and cycling - become more unpleasant and difficult. Green Transport Week wants to reverse this vicious circle.

What Does Green Transport Week Hope To Achieve?

Green Transport Week is a week of local events around Britain designed to:

- Raise awareness of the issues and highlight alternatives to the car;
- Make people stop and think before they drive;
- Send a message to government at all levels that alternatives to the car would be popular and deserve their support and investment.

Local Events, And How To Get Involved

If you are interested in organising your own event, there are ideas, together with examples of events from previous years, listed on the ETA website www.eta.co.uk. You can use Green Transport Week as a national banner to publicise what you're already campaigning on, or as a chance to get something rolling locally.

Many of the more successful events are jointly organised. Partners can include schools, businesses, environmental groups and councils. Events can be bike rides, walk to school weeks, special low public transport fares, and commuter races between transport modes; and they can be

designed to highlight issues like pollution, stress, traffic congestion, health risk, air quality and road safety.

As has become traditional, Green Transport Week will share a weekend (17/18 June) with National Bike Week (this year known as the Millennium Festival of Cycling). That gives organisers of bike events on that particular weekend the chance to publicise their events through both weeks.

Tell The ETA What You're Doing

Once the event is planned, details should be sent to ETA - send an email with your event details to richard@eta.co.uk or send a fax to 020 8946 0912. ETA will include your events in their national and regional press releases, and publish details on the ETA website.

EUROPEAN CAR FREE DAY

As reported in the last issue of Clean Air, 66 French cities and 92 Italian cities participated in 1999's car free day. Car-free areas were established in large parts of city centres, enabling people to discover their home town on foot, by bicycle or public transport. Twenty-two million people participated in the campaign, with more than 85% wishing to see the operation regularly renewed in the future.

Can It Work In Britain?

The ETA's own research suggests it can. ETA commissioned Oxford Brookes University to run a survey which found that:

- 75% of drivers in Oxford said that a total ban on traffic from the city centre would be preferable to the existing daily congestion.
- This percentage was even higher, some 84%, amongst those who did not own a car.

Drivers were then asked if they could be persuaded out of their cars by a national campaign urging them to leave their cars at home for one day a week. Most said they would not, because they did not believe that others would do likewise - and they would feel annoyed if they made the effort to use their car less while others, as they anticipated, used their cars as normal. Since drivers do not trust others to cut down on car use, they are unwilling to do so themselves.

The researchers concluded that mass behavioural change would not come about naturally as a result of the voluntary actions of individuals. People demonstrably want change, but since few will take the first step, change will have to be imposed by public policy.

The results from this research, together with the success and popularity of the French and Italian car free days,

suggest that there is a fair chance that a European style car free day involving road closures in town and city centres could indeed work here.

Does Size Matter?

The size of restricted areas varied from town to town in France, from a few yards in smaller towns to 40 miles of streets in Paris. However, ETA is recommending that event planners here aim for relatively small-scale popular events for this, the first year.

Car Free Day is not "anti-car" and it does not seek to cause gridlock anywhere; in fact, a well-planned Car Free Day event will help to ease traffic congestion and be beneficial to all transport modes. The day is about positive benefits in town centres for everybody to enjoy, like streets for people, clean air, peace and quiet, and safe roads where citizens are happy to spend some free time and traders can reap the rewards.

ETA is unlikely to ever get involved in campaigning against the car - as a motoring organisation, most of its members are car owners (as indeed are most members of the mainstream environmental organisations). The day is aimed simply at reducing the overbearing dominance of the car in our town centres, and redressing the balance towards the alternative modes. If we can accept the inappropriateness of pedestrians and cyclists using the motorways, why do we tolerate massive volumes of cars and lorries trundling endlessly through our high streets?

It is all a question of horses for courses really. No-one is out to ban the car outright, least of all the ETA. As noted above, most drivers would welcome car free town centres. CFD offers an ideal opportunity to experience this for one day. Then we can decide if we like it or not.

Further Information, And How To Get Involved

Closing streets is a job for local highway authorities. ETA has sent details of the campaign to every council in Britain, and published guidelines and a registration form on the ETA website.

ETA members can help by urging their local authorities to take up the challenge, and offering to organise appropriate events in partnership, so that positive use is made of the reclaimed street space.

Further information about the campaign and how you can help is at www.eta.co.uk and www.22september.org which links the major Car Free Day campaigns across Europe.

MEMBERS NEWS

Members – are we covering your news? Please check that your press office has Clean Air on its mailing list – or email your news direct to tbrown@nsca.org.uk

Calor Autogas is part of a joint venture which has developed an LPG-powered London Taxi. Transport Minister Lord Whitty launched the EcoCab, which has much lower emissions than the diesel equivalent, and is also considerably quieter. Thanks to the grants available and lower fuel duty, the average cabbie could be saving £50 per week in fuel bills, as well as helping to improve air quality. Information on 0207 874 6072



Corus and the **AA** have come up with a futuristic view of cars and driving. Their report *2020 Vision* surveyed industry experts who predict that in-car computers, interchangeable body panels and voice activated controls will become standard in 21st century cars. Information on 0207 539 2663 / 2691.

Safeway is on track to avoid 1.75 million lorry miles a year by extending its rail delivery operation to further stores in Scotland. The Scottish Office has awarded the company a Freight Facilities Grant of nearly £90,000 to develop its regional distribution centre and rail operations in Bellshill. Information on 0181 756 2269.

Leicester City Council has launched a new website to give residents information about pollution, traffic and public transport. It will enable visitors to patch into live television views of the city centre to monitor traffic levels. Motorists will be able to use the information to decide whether to opt for public transport instead. The site is on www.leicesterequal.co.uk, and is part of a seven-city partnership across Europe.

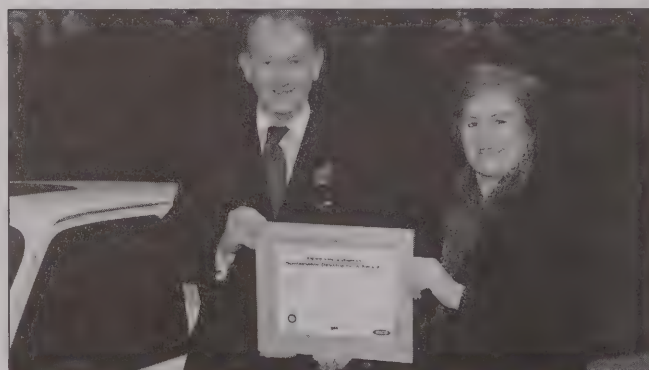
Leicester have also taken delivery of what is claimed to be the smallest mobile air quality station in the UK. **Enviro Technology Services** have fitted PM10, NOx and CO analysers into a Daihatsu Hijet van. It will be deployed to monitor pollution hotspots around the city and take part in a study on children's exposure to pollution. See www.et.co.uk.

Stanger Science and Environment also have a new mobile laboratory which has been in action measuring emissions from two new CHP plant in East Anglia. Real-time monitoring during the commissioning of the British Sugar

boiler plant allowed the engineers to maximise efficiency and check for compliance with emissions standards. Details from Bill Bell on 01902 385154.



Westminster City Council was one of three local authorities to win the NSCA Innovation in Sustainable Development Award last year. Our photo shows Cllr John Cox and Environment Initiatives Manager Joy Thompson receiving the award, for the Council's initiatives in developing its air quality improvement programme.



Johnson Matthey is to build a new autocatalyst manufacturing plant at its main UK site in Royston, Hertfordshire. The new facility will produce 3.5 million catalysts a year, including new systems for heavy duty diesels.

Southwark Council have announced that they will follow the lead of **Edinburgh** and establish a City Car Club in partnership with Budget Rent a Car. The Edinburgh scheme is celebrating its first birthday and now has 90 members. It has won the Fleet News Environment Initiative of the Year Award. See www.citycarclub.co.uk.

Greenergy has given a warm welcome to the announcement in the Budget that ultra-low sulphur petrol is to be given a 1p/litre tax incentive. The company supplies **Tesco** and **Sainsbury** with Citypetrol. According to Chairman Andrew Owens, ULS petrol is "the only fuel which will reduce emissions from older, pre-catalytic converter, vehicles which are gross polluters".

FORTHCOMING NSCA EVENTS

Wednesday 28 June

Public Acceptability of Incineration

Conference - Royal Society of Arts, London

Tuesday 12 September

Noise Update 2000

Training Seminar - NEC Birmingham

Monday 25 to Wednesday 27 September

Annual Conference and Exhibition - Scarborough

Environmental Protection 2000

Tuesday 14 November

Contaminated Land

Training Seminar - NEC Birmingham

Thursday 23 November

UK Dispersion Model Users Group

Workshop - London

Tuesday 13 February 2001

Training Seminar - NEC Birmingham

Thursday 15 and Friday 16 March 2001

Spring Workshop

Abingdon

For further details please contact

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and environmental protection

September/December 2000

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- *EU Climate Policy & IPPC*
- *Public Acceptability of Incineration*
- *Urban Vehicle Emission Inventories*
- *Planning for Air Quality*

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FORTHCOMING NSCA EVENTS

Monday 6 November

Air Quality: AQMAs and Action Plans

Training Seminar - RSA, London

Thursday 14 November

Contaminated Land - Progress Report

Training Seminar - NEC, Birmingham

Thursday 23 November

Dispersion Model Users Group

Workshop, London

Thursday 7 December

NSCA Annual General Meeting

London

Tuesday 13 February 2001

Training Seminar - NEC, Birmingham

Thursday 15 and Friday 16 March 2001

Annual Spring Workshop - Abingdon

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The National Society for Clean Air and Environmental Protection produces information, organises conferences and training events, and campaigns on air pollution, noise and environmental protection issues. Founded in 1899, the Society's work on smoke control led to the Clean Air Acts. More recently NSCA has been influential in developing thinking on integrated pollution control, noise legislation, and air quality management.

NSCA's membership is largely made up of organisations with a direct involvement in environmental protection: industry, local authorities, universities and colleges, professional institutions, environmental consultancies and regulatory agencies. Individual membership is also available to environmental specialists within industry, local authorities, central government, technical, academic and institutional bodies.

Members benefit from joining a unique network of individuals who share an interest in a realistic approach to environmental protection policy; from access to up-to-date and relevant information; from reduced fees at NSCA conferences and training events. They contribute to NSCA's regional and national activities; to environmental policy development; to translating policy into practice; to the Society's wide-ranging educational programmes.

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AND ENVIRONMENTAL PROTECTION
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Editorial

WANTED: LOCAL HEROES...

By the end of this year most local authorities will have reached a decision about whether or not to declare air quality management areas (AQMA) and the early indications are that the number of AQMA) will be higher than originally thought. Declaration triggers the next step in the process of local air quality management - preparation of AQ Action Plans. NSCA's Air Quality Committee is currently busy with the preparation of guidance on Action Plans, the first phase of which will be launched at a conference on 6 November (see inside back cover). However, many authorities are already considering the elements of their Plans.

There are several important aspects to this work. Firstly, there is the question of which measures can be taken locally, and what their actual impact on air quality will be. The introduction of low emission zones and roadside emission testing are two new tools which are available, but authorities must consider a complete package of measures which will tackle the local air quality problems effectively, without undue social or economic impact. This will require corporate thinking across the whole management structure of authorities at a time when air quality is still very much the province of specialists, largely within environmental health departments.

There is also the question of how far local measures, under the control of local authorities, can achieve national air quality objectives, and how much other organisations such as the Highways Agency, the Environment Agency, and national governments should contribute to the process. The charge of buck-passing is not a new one, but there is a real danger of a responsibility gap emerging between the key players, particularly where potentially unpopular decisions are required.

What is needed to make both air quality action plans and local air quality strategies work is local political championing of the issues. The key responsibility remains with local authorities to drive the process forward, and to speak out (through NSCA and other national bodies, if necessary) if they are being hampered or under-resourced in their activities. This demands that local politicians must take an increasing interest in the implications of local air quality management. They will need to sell positive policies which protect the health of their electorate, and improve the quality of the local environment, rather than react to complaints about traffic restraint and congestion charging.

Increasingly, the measures which are being described as, at the very least, unpopular by certain political and media interests, are being accepted as necessary by large sections of the public who value their health, safety and the environment in which they live. At national level politicians appear to be back-peddalling on the transport and environment agenda – we need more local political champions to show that cleaning up air pollution can be a vote-winner.

Environmental Protection 2000

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NSCA News

Community Wardens: A Framework for Policy

The need to rejuvenate our urban centres, in order to create stable communities and protect our natural heritage, has been argued for many years. It is clear that there is now an enthusiasm among developers, architects and policy makers to redevelop, repopulate and refresh inner city areas within the UK. However, Britain today is littered with a legacy of previous attempts at such "social engineering", in the form of run down "sink" estates, neglected urban centres and a poor quality urban environment. While lively, well populated cities are clearly desirable, and key to attaining sustainable development in this country, we must find ways to learn from previous mistakes and to develop systems for managing urban environments effectively.

In evidence to the Rogers Urban Task Force¹, NSCA argued strongly for the development of an effective system of community wardens as a key feature within a new and enhanced framework for local environmental management. NSCA welcomes the conclusions on this topic reached by the Task Force, and was encouraged to see the subsequent support for such a system reflected in the reports of Policy Action Teams 6 and 8, and within the Government's consultation proposals on a Strategy for Neighbourhood Renewal.

Through its Local Environmental Management Forum, NSCA is undertaking a review of practice and experience in this field. However, it is evident from Government publications so far that there are a number of key policy issues which will be crucial to the development of a worthwhile and effective system. While one of the strengths of the system is its potential diversity and its adaptability to fit local circumstances, the Society nevertheless believes that certain key elements of the policy, if it is to succeed, need to be established firmly and quickly if a viable framework is to result.

Accordingly, in advance of the results of its survey of practice to date, and ahead also of its detailed submission in response to consultation, this Note sets out suggestions on the key issues which now need to be addressed, and how they might be resolved.

Origins and Goals

The arguments for community wardens have to be seen within the context of wider policy considerations, two of which – emphasised in the Society's original evidence – are particularly critical. First, the urban social fabric of the UK has been seriously damaged over a number of decades by the disproportionately severe withdrawal of resources and investment from the actual management of local communities and delivery of local environmental services.

Investment in this area has not kept pace with capital projects or social welfare provision.

At the same time there has been a failure to recognise that relatively minor acts of vandalism and dereliction, if unattended, can have multiplier effects and provoke cycles of decline. A higher priority for management of the local environment, relatively marginal increases in resources, and a new seriousness in the delivery of local environmental services and control of anti-social activity, provides a far more effective recipe for urban regeneration than shifts in planning policy or large-scale capital investment, much as in certain circumstances these may be needed.

While this sets the context for community warden schemes, there are several distinct, more narrowly based arguments for their establishment, which, although closely allied, can lead to significantly distinct approaches:

i The 'extended' housing management function

Possibly the most significant factor in the creation of run-down estates over many years has been the neglect of basic local environmental controls, in terms of security, litter and graffiti, wider waste management, noise, and general environmental quality. This was compounded in particular by the withdrawal of traditional concierge, caretaker and warden schemes. Correspondingly, in the last few years, the most critical factor in turning round a number of estates has been introduction of effective internal security and management systems on a concierge basis. The basic case for community wardens in such areas is seen as the extension of this approach from the individual high-rise and deck access buildings to the wider estate and immediate neighbourhood.

ii The mismatch of residents' concerns and local authority priorities

Aside from the immediate security of their living area, innumerable social surveys have shown that among the leading worries and concerns of local residents are dogs, litter and graffiti, and anti-social activity. Yet these matters rank relatively low in local authority priorities and resource allocations, and characteristically are divided among different departments and services, and are relatively marginalised at the bottom of their respective priorities.

iii Organisation of services within local authorities

The apparently low priority given to basic environmental service provision has also resulted in a fragmentation of delivery, with services such as street cleansing, dog fouling and dog-warden services, front-line housing management, noise control, etc. being vested in unconnected departments and directorates within authorities. One consequence of this is that residents face a confusing and

ultimately disheartening bureaucratic array when trying to get involved in the improvement of their area. It also means that innovative projects, initiatives and ideas in one area are not carried across to other areas. This has the consequence that they do not achieve their potential and can ultimately fail because:

- a) they do not address the full range of residents' concerns and therefore do not engage with them and obtain their support, and
- b) it is extremely difficult to show results when attempting to tackle a single issue within a multi source problem. The benefits obtained by improving, for example, litter control, will tend to be wiped out by the problems caused by graffiti, vandalism, anti-social behaviour, fly-tipping, etc.

iv The enforcement gap

Litter, noise, graffiti, dogs and anti-social behaviour have ranked steadily lower among police enforcement priorities, and this was exacerbated in particular by the Core Tasks Review under the previous administration. With local authority resources constrained, and major uncertainty as to their enforcement role, many of these functions effectively slipped through cracks in policy and administrative systems.

These different considerations – housing and social welfare, environmental management, and public order – all point to the need for creation of a new function and policy. They also suggest that, given the right decisions now, there is scope for a triple dividend from the right sort of response. However, these diverse considerations inevitably mean there are some difficult choices to be made if overall an effective system is to emerge. Most of the key immediate judgements concern the differing priorities among those three discrete considerations which could be given to such schemes.

The Issues Now

On the basis of its earlier investigations, and the views assembled so far from its members, NSCA considers that there are at this stage some half-dozen key issues to be resolved about neighbourhood warden schemes. These are as follows:

What should be the focus?

Over the last few months the main thrust on neighbourhood warden issues has been made by the Home Office, and the focus of public presentation has been implications for security and a reduction in the fear of crime. These are of very great significance, but we doubt that such a presentation and focus will aid effectiveness. The contribution to security will come simply from having the service available on the ground with some enforcement powers.

However its local reputation and acceptability will depend on it being seen as having a positive role in the amelioration and management of the local area. On balance therefore the best approach would be to focus the service on local environmental management and

enforcement, with other functions appearing supplementary to that. Clearly in highly-integrated estates there is a case for linking the service with the housing management function, but this would not always be appropriate.

Unless schemes can show tangible and rapid results in terms of the improvement of the local area, they will not engage the support of local residents. In many ways, it is not the wardens themselves who will drive forward greater improvements but the community itself, with the warden as the catalyst and facilitator. Therefore, full community engagement must be secured at a very early stage and simply focusing on the single issue of crime, ignoring the more obvious issues of environmental degradation, will not achieve this. There therefore needs to be a more holistic approach which, while it is more challenging, is more likely to show results and to succeed.

The range of functions with which warden services could become associated is considerable; although of course not unlimited and over load must be avoided. For example, an enhanced warden service could potentially secure improvements in the basis for local environmental management which go beyond more effective enforcement. In particular, a new approach is needed to litter policy. In the longer term the aim must be to reduce the volume of waste that becomes litter, to increase the effectiveness of litter cleansing operations, for instance by extending the application of industrial cleansing systems; and make further progress through the planning systems to "design out" litter. But in the end an effective warden system is required, and that effectiveness will depend on a more extended role, of clearer enforcement capability, better links to the local community, and the confidence and public support that comes from being seen to deliver effectively.

A similar position obtains in relation to a variety of matters subject to nuisance legislation. For instance, enforcement of night-time noise legislation suffers from the fact that it tends to be an ad hoc intervention at an extreme point, without the support of adequate previous local monitoring and background information, and without therefore the capability to intervene earlier on a preventive or precautionary basis. A wider approach will also need to be considered for traffic wardens, making them a resource for the implementation of idling vehicle regulations and the range of provisions which will be required to minimise the impact of vehicles in sensitive urban areas, such as low emission zones and home zones.

Whose service?

In policy reports so far, the question 'who manages the service?' has been left somewhat open. It is seen to exist in a limbo between local authorities and the Police, with the implication that in some areas it might be linked to community groups. We believe this is too incoherent a basis for the establishment of an effective service. The right location for the service is the local authority, which has the widest range of actual responsibilities, working of course in close association with the local Police Service. Only the local authority has the depths of resources,

stability, and range of support available to make a success of such schemes, and democratic accountability requires that they should be located with them.

How established and funded?

We believe that the appropriate course is to bring together functions, some staff, and resources by top-slicing a variety of existing programmes into a consolidated multi-functional warden service. This could be part of a town management, or monitoring, or other department, but must be seen to have a central position within the local administration. Core funding should be from a mixture of top-sliced programmes supplemented by an extension of fixed penalty charges in relevant areas.

Local links

Clearly, to be effective, and in particular to be able to anticipate difficulties and fulfil a preventive role, wardens have to have their own 'patch'. There is the suggestion in some Government reports that they could also be locally resident, sometimes coming from co-operative housing management schemes. We very much doubt the feasibility of this if they are to have an effective enforcement role, which is a priority. Living away from the area is the only way in which wardens endeavouring to be effective in their local area can be seen to be independent and their own interests be insulated from excessive demands and pressures. Further, we doubt the merits of allowing the warden system to be linked directly with co-operative housing management schemes.

No new powers?

The Society regrets the reference in consultation documents to neighbourhood wardens having 'no new powers', for two particular reasons:

- i. First, this obscures the fact that they could be given a variety of new fixed penalty charge powers, and that they could also enjoy most of the practical powers of constables in terms, for instance, of cautioning, even if the main arrest powers remained with the Police. It is essential that the Government's message should be not that wardens require no new powers, but that they would be given whatever new powers are required to enable them to operate effectively, even if the Government currently believes that existing powers will prove adequate.
- ii. Secondly, the aggregation of a variety of local environmental management functions with the warden service should be the occasion for a review of the effectiveness and implementability of those functions. All too many of them are now unduly bureaucratic and legalistic, and the balance of the legislation needs to be shifted to allow easier remedy and enforcement. The priority should be to enable quick and effective remedial action, even if this requires entering and taking action on private premises, and even if it risks a higher level of mistakes and compensation payments. Too many systems are, at present, too bureaucratic and legalistic in their attempts to avoid error that they undermine any

effective action to remedy the original problem. For example, it cannot really be sensible for local authorities to have to spend far more than its intrinsic worth in storing an abandoned car and seeking to identify its owner. A swifter, less costly and more effective solution is to dispose of the car and compensate its owner should they emerge to claim it.

Guiding Principles

The exact structure, objectives and operation of warden services will, of course, vary according to area type and service need. However, there are common threads which run through all of the successful schemes to which NSCA has had access. The following principles are an attempt to distil out these commonalities and we feel that they should guide and inform the structure and function of any Community Warden Scheme:

1. Addressing single issues separately and individually within multiple source problems will not be totally effective and is likely to fail.
2. Services must be co-ordinated at and by the local level.
3. Services must be accessible and accountable to the local community, with a single access point wherever possible.
4. Warden schemes must have the full and explicit backing of the local authority and central government in order to succeed.
5. Warden schemes must have priority access to environmental services in order to obtain rapid and tangible results.
6. Schemes must be implemented, to a degree, throughout the local authority area, to ensure full political and public support, and prevent resentment through excessive "resource funnelling."
7. The Government should quickly review local authority powers and enforcement practices with the aim of increasing the scope for rapid remedial action.
8. Wardens themselves should reflect the community in which they operate, in terms of age, gender, ethnic group, religion, etc. While it is not intended to encumber services with rigid and unreasonable targets, such representation will be important if community support is to be secured.
9. Wardens should be recruited on the basis of their skills in leadership and an ability to work independently "in the field", rather than by virtue of existing or previous local authority experience. In addition, where an enforcement function is envisaged, good practice suggests that wardens should not be resident in areas in which they work.

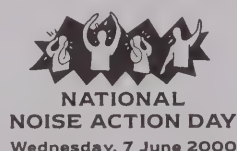
In support of these, the following must also be in place:

1. Local authorities must have a duty to prepare, through participative consultation, community plans for their entire area, and
2. Local authorities, the Police and other local service providers, must have sufficient flexibility in their funding and enforcement powers to allow for partnership working and innovative projects and ideas.

Generally, enhanced warden services provide a potential basis for more flexible integration of environmental services at local level. Where community wardens have been introduced, they have been found to be very cost-effective, leading to strong pressures for a steady widening of functions. This benign trend however carries its own risks if the service in consequence becomes over-burdened or loses coherence, including so called "mission-creep". This points to the importance from the start of some clear policy principles, developed initially at the national level but which can be adapted and elaborated in consultation with the range of local interests.

1. Memorandum to Urban Task Force, September 1998, NSCA.

National Noise Action Day, NSCA Activity Report



The fourth National Noise Action Day coordinated by NSCA was the most successful so far. The day achieved nationwide participation and media coverage, with widespread enthusiasm from participating local authorities and national organisations. There was an unprecedented demand for support materials and NSCA leaflets from NAD participants. Feedback from local authorities suggests that they were very happy with the materials provided, that they support Noise Action Day and that some are already planning NAD 2001!

Participation

- We know of 225 local authorities who took part in NAD – about the same number as in 1999. Information was also requested by CABs, mediation groups, businesses, schools and community groups. NAD has become an established annual event and nearly all of the local authorities who did not participate this year expressed their intention to do so in the future, given adequate notice and resources.
- Media coverage was received at national and local level including BBC TV news, Radio 4 Today, The Times and the Jimmy Young show on R2. Much of the national coverage focused on the NSCA survey and policy objectives, while at local level the activities of local authorities and others were covered. CPRE issued a press release on tranquil areas – and this received a lot of local coverage, as did an RAC release on traffic noise.
- For the first time DETR employed a PR consultancy to raise the national media profile, and NAD was brought into the DETR 'Are You Doing Your Bit' campaign, using the slogan 'Noise reduction: are you doing your bit'. Other national organisations with an interest in noise issues were also actively involved in promoting NAD.

Objectives

NSCA objectives for NAD were to:

- Promote communication and consideration rather than conflict and conviction;
- Educate and inform both noise makers and noise sufferers about the impacts that noise can have on our everyday lives;
- Enable local authorities to highlight local noise issues and inform the public of services available;
- Encourage everyone to take a quiet moment to think about the noises they make and the noises that affect them – and what they can do to reduce the impact.

On Noise Action Day NSCA also published the National Noise Survey and Ten Targets for Tranquillity.

Ten Targets for Tranquillity

1. **National Noise Strategy** to ensure a positive approach to noise management, and prevent further erosion of the UK's remaining tranquil areas.
2. Local authorities to develop **noise management policies** based on citizen panels and good neighbour guides.
3. Take full account of noise in **planning policies**, using new techniques such as **noise mapping**.
4. Reducing **transport noise** must be a core objective of the Government's forthcoming 10 year Transport Investment Programme.
5. Powers for local authorities to enforce noise mitigation agreements at **airports**, as promised in the Government White Paper *A New Deal for Transport: Better for Everyone*.
6. Introduction of **quieter road construction techniques** including quieter surfaces and noise barriers, in all new road construction and highway improvement schemes.
7. A high profile public information campaign on the **risks to young people's hearing from** amplified music, and the introduction of noise and sound into the National Curriculum.
8. Improved, enforceable standards of **sound insulation** in both new and existing buildings.
9. Local authorities to have a central role in **industrial noise control** under the new IPPC* regulations.
10. Integration of noise into the **UK Sustainable Development Strategy**.

*Under an EU Directive Integrated Pollution Prevention and Control (IPPC) will apply to a wide range of industrial installations – permits are issued by the Environment Agency, who must consult local authorities on noise.

Summary

Noise Action Day promoted widespread discussion in the media at national level – mostly centred around the NSCA National Noise Survey. At local level coverage focussed on local events and issues. It was encouraging that the

majority of the media took a pragmatic stance on the issue, rather than focusing on “neighbours from hell” sensationalism. A number of radio stations promoted debate by having phone ins – including the Jimmy Young show. Many local authorities worked with schools, the general public and local mediation services in raising awareness of general and local noise issues. The National Noise Survey and Ten Targets for Tranquillity published by NSCA highlighted areas of policy that need to be addressed.

National Noise Survey 2000 - Summary

Introduction

The NSCA, through its National Noise Committee, is the only independent multidisciplinary non government organisation working on noise policy in the UK. As noise pollution has become an increasing matter for concern, NSCA has carried out research to gauge the opinions of the local authority officers who enforce current noise control legislation and to inform the debate about future policy development. This survey was sent to all Chief Environmental Health Officers in the UK in April 2000, asking for their opinions on levels of complaint, current legislation and dispute resolution and future policies for managing noise.

Results for England, Wales, and Northern Ireland were analysed separately from Scotland as legislation and procedures differ. To enable us to identify trends, results were compared with those from previous NSCA Surveys.

NSCA would like to thank all those authorities who provided information.

Main Findings

- An increasing proportion of noise complaints are about **amplified music** – from both domestic and commercial sources.
- Local authorities believe a **National Noise Strategy** is needed to ensure a positive approach to noise management and to prevent further erosion of the UK's remaining tranquil areas.
- Informal methods of dispute resolution such as **mediation** are believed to be more effective in resolving noise problems than legislation – they address the issues underlying many noise complaints and can improve community relations.
- **Two thirds** of local authorities now have an officer on duty to respond to noise complaints **outside normal working hours**, with one third providing 7 day a week, 24 hour cover.
- **Three quarters** of responding local authority officers believe that better education on noise issues is needed, although only 17% currently carry out this work.

An overwhelming 88% of local authorities would welcome a National Noise Strategy, to give greater consistency to the way both domestic and ambient noise problems are tackled.

An increasing majority of local authorities are responding to night noise complaints – but only 13 use the 1996 Noise Act. Local authorities are content with the flexibility of current legislation, but are frustrated by public misunderstanding of what is actionable in law.

Many officers believe that as our capacity to make noise has increased, so tolerance has decreased – and that there is a lack of communication between neighbours. To quote one respondent “noise complaints are symptomatic of social disfunction”. While 75% feel that better education on noise issues is the way forward, only 17% currently carry out health education work as a matter of routine. However nearly half participate in National Noise Action Day. This suggests that resources need to be targeted at more proactive education work rather than attempting to use legislation where it is inappropriate.

Summary of the Noise Survey 2000

Complaints

Method of recording complaints

There has long been a wide variation in methods used by local authorities to record noise complaints, which makes it difficult to gain an accurate picture of trends. In 1997, following the recommendations of a Government working party on noise, the Chartered Institute of Environmental Health (CIEH) published a noise management guide, which presents a standard method for recording noise complaints. Our survey however found that currently only 9% of responding authorities use this method of recording. The majority use their own established systems and/or have computer systems that cannot accommodate the CIEH's recording method. However 50% feel that a uniform method is required.

In order to gain an accurate picture of the noise problem in the UK, an accurate picture of trends in complaints and the use of current legislation would be helpful. There is a need for practicable guidance for local authorities on recording complaints.

Number of complaints

As we are aware of the disparities in complaint logging, we ask officers dealing with noise to identify, in their opinion, the most common causes of complaint.

- **Neighbour Noise** - amplified music remains the main source of complaint for 68%, followed by barking dogs for 49%, TV is third for 20% and voices and DIY the third most common for 16%.
- **Ambient Sources** - pubs and clubs are by far the largest source of complaint - in the top three for 91%, followed by 78% for industry and 63% for construction. It is

interesting that traffic, the most prevalent source of environmental noise, generates a relatively low number of complaints to local authorities. This may be because people are aware that environmental health officers cannot tackle this problem; a perception that nothing can be done about it; a perception that it is central government responsibility or that they are used to the noise – however a third of local authorities think traffic noise is a problem and eight gave it as their most common source of complaint. These were a mixture of urban and rural areas.

The proportion of complaints about amplified music from both domestic and commercial premises is increasing. Management of noise from these sources must be addressed. An education programme on the effects of loud music on hearing – as well as on neighbours, should be implemented.

Research looking into current awareness and perceptions of traffic noise would inform future policy development to control this source.

Change in the number of noise complaints over the last year

• **Neighbour noise** – for 50% of respondents complaints about amplified music are increasing. This is an increase from 44% in 1999. A lesser proportion of local authorities than last year are reporting a drop in general neighbour noise complaints. This could indicate that an increased awareness of noise services leads to more complaints or that we are getting noisier.

• **Ambient sources** – complaints about pubs and clubs are increasing for over half of respondents. 41% report decreasing complaints about industrial noise. Half of responding local authorities report a decrease in complaints about traffic noise.

For the majority of local authorities there is no improvement in the noise climate, and it is still deteriorating for a significant number.

Legislation and Enforcement

Night time noise services

Two thirds of local authorities now have an officer on duty to deal with noise out of office hours, and of these 32% provide 24 hour 7 day cover. The type of cover varies - in most cases authorities adjust the service according to demand and resource allowances. The proportion with no night time cover has reduced slightly. Of the 24% with no night cover, about half say that night time noise is not a major problem. This reflects the differences in demand for the service in different areas. Out of hours staff are primarily those working in environmental health and who are accustomed to dealing with the public.

Local authorities appear to be tailoring their services to address local levels of night time noise.

Current Legislation

Noise Act 1996

In this year's survey only six respondents have implemented the Act, but we know from previous work that 13 have. Ninety per cent are unlikely to adopt it. The main reasons are that their existing services and legislation are deemed adequate and the prescriptive provisions of the Act do not justify the resources required. The Act is currently being reviewed by the Department of the Environment, Transport and the Regions. However, the powers of confiscation under the EPA have proved a useful tool for abating the main sources of complaint – amplified music and dogs. A year after implementation the *Crime and Disorder Act* has been used by 26 authorities – mostly where noise is symptomatic of a wider anti social behaviour problem.

We hope that the review of the Noise Act will generate more appropriate guidance to local authorities for night time noise management.

Mediation

Over half of local authorities have used mediation in dispute resolution. Fifty-two per cent think mediation is a more effective means of resolving disputes than legislation and 35% that it improves community relations. It can frequently resolve the underlying issues that may be behind a noise complaint and can address the many cases where a problem exists, but statutory nuisance does not apply. Mediation is principally carried out by independent mediation services - and local authorities also see this as an advantage in dispute resolution. Mediation UK would like to see an increase in local authority use of mediation services and properly trained mediators. In this way noise disputes can be settled early on, thereby preventing further, more serious, deterioration in neighbour relationships, saving the time and money involved in legal action.

There is a majority opinion that mediation is an effective way of resolving noise complaints - which are often symptomatic of underlying problems.

Future Noise Policy

Reasons for complaints

Incompatible lifestyles (73%), higher expectation of quiet (65%), and selfish attitudes are increasingly perceived as the reasons for increasing noise complaints. Seventy-one per cent feel the public have unrealistic expectations about noise. The general feeling can be summarised by one respondent - 'The breakdown in communication between neighbours is endemic in society'. Seventy-two per cent feel that the way forward is better education on noise issues compared with only 30% who want more prescriptive legislation. Only 17% currently carry out any sort of proactive education on noise issues, but about half participate in National Noise Action Day.

It is clear that more resources need to be directed to proactive education on noise and related issues.

Nuisance legislation

The majority say that existing legislation on noise is adequate and that nuisance provisions are still appropriate as they allow flexibility in dealing with different noise environments. However, many feel that there is a gap between public perception of nuisance and the legal definition. Complaints are often resolved informally, without resorting to the law. Many experience difficulty in gathering evidence to prove nuisance – noises complained about are often transitory and witnesses reluctant – and cite justified cases for complaint which do not constitute a nuisance. To quote one respondent 'There is a gulf between what is annoying and what requires enforcement'.

Local authorities are content with the nuisance provisions, but clarification, better education of the public on what constitutes a nuisance and on expectations of noise, is needed. More weight should be given to informal resolution.

Traffic noise

Eighty local authorities (33% of respondents) consider traffic noise to be a problem, and 21% are currently undertaking ambient noise monitoring. There is increasing concern that noise from traffic – particularly motorway noise, is eroding the few remaining areas of tranquillity in the UK.

Management of traffic noise needs to be addressed by traffic reduction, noise barriers and quieter road construction techniques.

Aviation noise

Seventy local authorities consider aviation noise to be a problem. Only 14 give it as a source of complaint (around major airports residents will most likely complain to the airport authority). Sixty-one per cent would support the introduction of legislation to enable local authorities to control noise at airports and airfields.

Local authorities are in favour of the introduction of powers to enforce noise mitigation at airports, as promised in the Government White Paper "A New Deal for Transport: Better for Everyone".

Noise mapping

Noise mapping is the subject of draft EU legislation, which will require large cities to draw up noise maps. These will enable them to assess ambient noise levels outdoors – the main source of which is traffic. Currently 13 local authorities are carrying out noise mapping and 73 are considering it.

Pending EU legislation, a number of local authorities are using noise mapping as a potential planning tool.

A National Noise Strategy?

Eighty-eight per cent of responding local authorities would welcome a strategy that would give greater coherence to

policy and action on noise. This support is based on the proviso that any strategy should not be too prescriptive, allowing for the very different noise climates and problems in urban and rural areas. A few feel that a national strategy cannot adequately address what is in many cases a very localised problem.

There is a need for a national strategy for noise, to provide more coherence in approach to noise management, while allowing for flexibility in addressing local issues.

Conclusions

From the above it appears that complaints about noise are still continuing to increase. This may be an indicator that we have reached a higher level of awareness of the noise problem and there is greater awareness of who to complain to. However, there is a general perception overall that we are noisier and more selfish, and expect to be able to do what we like and not be interfered with by others; as one respondent put it – there has been 'a fundamental change in social attitudes'. These opinions lead towards the conclusion that noise is not the core of the problem – it is the relationship between neighbours. In addressing this education is believed to be important but hardly used. While nuisance is still valued for its flexibility, prescriptive measures are not deemed to be the way forward by the majority (as demonstrated by poor uptake of the Noise Act). There is a gap between public expectation of noise levels and what is enforceable in law.

These are all issues that a National Noise Strategy can address, in tandem with local noise management policies based on citizen panels and good neighbour guides.

Mobile Phones - Health & Planning Issues

The NSCA training seminar on health and planning issues relating to the mobile phone network drew a large attendance. Helen Smith of DETR gave delegates an update on current official advice.

Licensed telecommunications code system operators are authorised by the *Town and Country Planning (General Permitted Development) Order 1995* – commonly referred to as the GPDO – to install specified telecommunications apparatus without the need to make a planning application to the local authority. However, the current planning framework includes well established policies for the protection of the countryside and urban areas, in particular our National Parks, Areas of Outstanding Natural Beauty, conservation areas and Sites of Special Scientific Interest. The installation of any telecommunications mast in such areas is subject to a full planning application. A full planning application is also required for the installation of any telecommunications mast in excess of fifteen metres in height wherever it is to be sited.

Whilst the GPDO allows licensed telecommunications operators a certain amount of freedom to install specified telecommunications apparatus without the need for a planning application, some types of development are subject to a prior approval procedure. Under this procedure a Local Planning Authority has the opportunity to say – within 42 days for ground based masts, and 28 days for masts on buildings or other structures – whether it wishes to approve details of the siting and appearance of the mast. If the authority considers that the development will pose a serious threat to amenity, it is able to refuse approval.

Health considerations and public concern can in principle be material considerations in determining applications for planning permission and prior approval. Whether such matters are material in a particular case is ultimately a matter for the courts. The Independent Expert Group's study into mobile phones and health* concluded that "the balance of evidence indicates that there is no general risk to the health of people living near to base stations on the basis that exposures are expected to be small fractions of the guidelines. However, there can be indirect adverse effects on their well-being in some cases". The Group recommended a precautionary approach, comprising a series of specific measures, to the use of mobile phone technologies until we have more detailed and scientifically robust information on any health effects.

In its initial response, published on 11 May, the Government welcomed the Group's report and accepted many of its recommendations. In particular, the Government accepted the recommended precautionary approach as advised by the report. The Government's response outlined the range of actions being taken forward in response to the report's specific recommendations. Copies of the Government's response were sent to all Chief Planning Officers on 11 May.

The Government response also indicated that it is minded to introduce a requirement for full planning applications for all new telecommunication masts, and plans to consult widely on both the principle of moving to full planning applications and the precise scope of any new arrangements. In the meantime, until new measures are introduced, Local Planning Authorities should not delay consideration of applications for telecommunications developments or devise their own precautionary action, but should continue to deal with applications on the basis of current law and guidance.

* Independent Expert Group on Mobile Phones. Mobile Phones and Health. Chairman Sir William Stewart. £20.00. Available from NRPB or on www.iegmp.org.uk

Copies of the full conference pack, containing a range of papers on health and environmental issues relating to the mobile phone network, are available from NSCA price £10.

Cleaner Transport Forum

The CTF is now well established, with wide representation across industry, local authorities and the research

community. It has a track record of useful work on cleaner fuels and low emission zones (LEZs). The Forum is funded by an annual subscription from commercial members.

CTF is currently overseeing a £26K research programme on LEZs which will report in December. Work has focused on agreeing emissions criteria for access to LEZs, which will be published in September. Our consultants are now working with individual local authorities on the designation and implementation of LEZs.

The Forum is well poised to pick up a number of issues developed by the Cleaner Vehicles Task Force which has recently disbanded. NSCA will meet DETR officials shortly to explore the most promising options. These are likely to include:

- national issues arising from LEZ research (eg vehicle emissions certification);
- consumer issues (eg new vehicle ecolabelling);
- information on the relative merits of alternative and conventional fuels;
- emissions enforcement;
- fleet management.

As well as acting as a sounding board and policy forum on these matters, it seems likely that LEZ research may well require further work, as air quality Action Plans are drawn up and further practical implementation issues arise.

Public Acceptability of Incineration – Research Project

The NSCA research project into public acceptability of incineration was launched at a conference in London on 28 June. Environment Minister Chris Mullin reaffirmed the Government's view that energy from waste (EfW) plant will have a role in the waste management hierarchy (see article in this issue of *Clean Air*). He also praised the NSCA's campaigning role in improving emission standards for new incineration plant, and welcomed the Society's work on public concerns. From the Department of Health, Dr Bob Maynard suggested that modern incineration plant pose an "insignificant" risk to health. However Sarah Oppenheimer from Friends of the Earth raised concerns about the effects of EfW plant on recycling rates, and about the toxicity of ash residues from incineration.

The NSCA research project will now investigate issues of public concern and review the option for improving community involvement in decision-making about EfW plant development. Members who would like to contribute to the research programme can contact Tim Brown: tbrown@nsca.org.uk or the project consultant Maggie Thurgood: mthurgood@dial.pipex.com

A resource pack which includes available papers from the Public Acceptability of Incineration Seminar is available from NSCA, price £15.00, inc. pp.

Reports

EU Climate Policy and Integrated Pollution Prevention and Control

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Climate change policy documents at both the national and European levels have highlighted the potential role of the Integrated Pollution Prevention and Control (IPPC) regime in tackling climate change. For example, the DETR originally suggested that the requirements of IPPC could significantly reduce carbon dioxide emissions from industrial sources (DETR, 1998). Similarly, last year the European Commission highlighted the potential role that the monitoring and reporting requirements of the regime could have with respect to climate change (CEC, 1999). As the Regulations that fully transpose the 1996 IPPC Directive (CEC, 1996) finally come into force, this article explores the connections between IPPC and climate policy. However, it does not discuss the voluntary agreements that have been concluded with industry in the UK as part of the climate change levy, even though the conclusion of these may have an effect on the application of IPPC in practice. The article starts with an overview of the IPPC Directive and of its requirements in relation to climate change. This is followed by a discussion of the reporting requirements of the Directive and the implications of these for climate policy. The article concludes with a discussion of the potential importance of IPPC for climate change.

The IPPC Directive

The principal aim of the IPPC Directive is to introduce a more integrated approach to controlling pollution from industrial sources. Whereas traditional approaches to pollution control have focused on one pollutant or type of pollutant (e.g. gaseous emissions) to one environmental medium (e.g. air), IPPC aims to consider all emissions to all environmental media. Consequently, in regulating industrial installations under IPPC, emissions to air, water and the soil must be considered together, alongside the production of waste and other environmental considerations, including energy efficiency.

IPPC applies to major industrial activities and is wide-ranging as it includes, for example, the intensive farming of

poultry and pigs. Existing installations will have to be brought under IPPC by 2007, while new installations should have been subject to IPPC from October 1999. The primary piece of legislation to implement IPPC in the UK received Royal Assent in July 1999, but this does not fully implement the Directive into UK law. The Pollution Prevention and Control Regulations 2000, which complete the transposition, have only recently come into operation.

The IPPC regime puts the onus on controlling emissions on the operator of the proposed installation. Each operator will have to apply for a permit to operate its installation from the competent regulatory authority. In England and Wales, the regulatory authority is either the Environment Agency or local authority depending on the type of installation, whereas in Scotland it is the Scottish Environmental Protection Agency and in relation to offshore installations it is the Secretary of State for Trade and Industry. Operating an installation without such a permit will not be allowed. The permit application must show, among other things, that the operator has:

- fully considered the potential environmental effects of the proposed operation;
- identified proposed techniques to prevent, or at least minimise, pollution; and
- detailed the proposed measures to monitor emissions to the environment in the course of the operation of the installation.

After sufficient consultation and due consideration, the regulator has to decide whether or not to grant the permit to operate the installation. If granted, the permit will include a set of emission limit values (ELVs) for the pollutants likely to be emitted as well as identifying the 'Best Available Techniques' (BAT) which are to be used to ensure the necessary level of environmental protection. The conditions of the permit will also include monitoring and reporting requirements, including the monitoring methodology, frequency of monitoring and how the monitoring is to be evaluated. The ELVs are to be determined in accordance with BAT, but should also be sufficient to ensure that emissions do not breach local environmental quality standards.

ELVs can potentially be set for any pollutant or group of pollutants, but a list of particular pollutants that should be considered is given in Annex III of the Directive. None of the six greenhouse gases in the Kyoto Protocol is explicitly included in the list, but most of them are implicitly included. For example, methane (CH₄) and nitrous oxide (N₂O) are implicitly included as the list contains volatile organic compounds and oxides of nitrogen, respectively. Having said that, when the term 'oxides of nitrogen' is used in relation to pollution, it is usually taken to refer to nitric oxide (NO) and nitrogen dioxide (NO₂), but not N₂O as the latter's principal adverse environmental effect is with respect to climate change. Similarly the principal adverse environmental effect of CH₄ is in relation to climate change, so CH₄ would not necessarily be included in a list of 'volatile organic compounds' in this context. Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) are also implicitly included on the list as it contains 'fluorine and its compounds'. However, carbon dioxide (CO₂), which is the most significant greenhouse gas, is not included, even implicitly, on the list.

Even though an ELV need not necessarily be set for CO₂, emissions of the gas could be controlled by the fact that IPPC requires the consideration of energy efficiency in two respects. First, energy efficiency is one of the considerations in determining BAT for a particular process. However the determination of BAT may require trade-offs, so the most energy efficient technique need not necessarily be identified as BAT after other considerations have been taken into account. Second, energy efficiency is a general principle to be considered in the operation of installations regulated under IPPC. This includes the need to consider the energy efficiency of such things as components involved in process control and building services, e.g. lighting. A permit may impose conditions for energy efficiency, but this is discretionary.

The European Pollutant Emission Register

As there is no explicit requirement to report greenhouse gas emissions in the IPPC Directive, it would not, in itself, be able to inform climate change policy in this respect. However, the Directive requires the development and maintenance of a European Polluting Emissions Register (EPER). This will contain information supplied by the Member States, which the Commission will aggregate into an inventory of emissions and sources responsible, which will be published every three years. The Directive does not stipulate the particulars of the information to be included on this register, but effectively delegates this responsibility to a Committee composed of representatives of the Member States and chaired by the Commission.

The information requirements for the EPER have recently been published, after consultation with Member States, in a Commission Decision. As expected, they go further, in some respects, than the list of pollutants for which an ELV might be set, as contained in Annex III of the Directive. The list of pollutants to be reported to the Commission for inclusion in the EPER is set out in Annex A1 of the new Decision and includes the six Kyoto greenhouse gases. Member States are,

therefore, required to report emissions of these gases from IPPC installations to the Commission. Consequently, Member States will have to obtain this information in respect of IPPC installations, for example by requiring the reporting of such emissions in the permit conditions. However, emissions of a particular pollutant only have to be reported if its respective threshold value, which is also set out in the Annex, is exceeded.

IPPC and Climate Change

In its 1998 consultation on its climate change strategy, the UK Government estimated that as a result of the requirement to consider energy efficiency under IPPC, UK annual carbon emissions might decline by as much as 3 million tonnes a year by 2010 (DETR, 1998). However this estimate has since been revised downwards to 2.5 million tonnes of carbon a year (and this figure includes reductions to be achieved by agreements with the energy intensive sectors under the climate change levy) by the draft climate change programme (DETR et al, 2000). This is less than a tenth of the reduction required if the UK is to achieve its Kyoto greenhouse gas reduction target of 12.5 per cent by 2008-2012. However, as the figure of 2.5 million tonnes of carbon also includes reductions achieved through agreements with energy intensive sectors under the climate change levy, the impact of IPPC will be significantly less than this in practice.

The fact that the UK's draft programme no longer contains an estimation of the potential emission reductions that could result from the energy efficiency requirements of IPPC underlines the uncertainties regarding its potential effect. Part of this results from the difficult balancing act that operators and regulators might have to perform in the determination of BAT. For example, some processes that reduce pollution, such as flue gas desulphurisation, increase energy consumption. In these cases, therefore, regulators will have to make an assessment of whether it is better to pursue lower emissions or higher energy efficiency. In general terms, however, IPPC is intended to promote the development of clean technology which should normally reduce emissions and energy consumption rather than end-of-pipe measures which often have an energy penalty. In this respect, IPPC is seeking to change the culture of industry, which may mean that its greatest benefit will be achieved over the long-term.

The development of the EPER is a potentially useful aspect of the IPPC Directive with respect to climate change. However, it may be more useful in relation to emissions trading, than with respect to monitoring emissions. Its potential use in relation to the latter is limited as the emissions that will be reported to the EPER will not be comprehensive. This is true from the perspective of climate change in general, as IPPC only covers 60 per cent of energy used in the manufacturing sector in the UK, and by no means all emissions sources in either the energy or agricultural sectors. The lack of comprehensiveness is also relevant with respect to the installations regulated under IPPC, as only emissions released above a certain threshold have to be reported. This varies for each of the greenhouse gases, for example, for

CO₂ it is 100,000 tonnes. Consequently, even for those installations regulated under IPPC, not all emissions will be included on the EPER.

However, the emissions and sources reported to the EPER are increasingly being seen as potentially forming the basis of a European emissions trading regime. This year's Commission green paper on emission trading asked for comments on whether the IPPC Directive offered a useful starting point for a Community emissions trading system (CEC, 2000). Under this scenario, installations covered by IPPC could be used as a starting point to define the scope of a trading system and the emissions reported on the EPER could be used as the basis of the trading system, itself. The fact that some emissions and sources are not included on the EPER need not be of concern as the principal emitters will be included, and it is these which are most likely to be included in any future emissions trading system.

In conclusion, while the role of IPPC in reducing greenhouse gas emissions has been revised downwards in recent years, the Directive does have a role to play in reducing emissions from the installations that it covers. However, the development of the EPER, which will require the reporting of emissions of CO₂ and other greenhouse gases from major emitters, could well turn out to be a suitable basis on which to develop a future European emissions trading system. Whether it will, depends on the result of the consultation on a European emissions trading system that began with the publication of the Green Paper earlier in the year. All in all,

therefore, the potential links between IPPC and climate policy are more numerous than they first appear, especially when the voluntary agreements with industry under the climate levy are also included.

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Public Acceptability of Incineration

The incineration of waste, be it municipal or otherwise, has always been a highly controversial subject and as a result, many individuals and organisations who have much to add to the debate have been reluctant to become engaged. This has left a gap within which often exaggerated, and in some cases false, claims and theories have been allowed to flourish. In an attempt to facilitate a more reasoned debate, and as part of its Public Acceptability of Incineration project (see NSCA News and Views in this issue), NSCA organised a one day conference on 28 June at the Royal Society of Arts, London, on waste incineration. The keynote address, which is reproduced below in full, was given by Chris Mullin MP, Parliamentary Under Secretary of State at the DETR, whose responsibilities include waste.

Thank you for asking me to speak today. I intend to give a brief overview of how waste incineration fits into the Government's waste strategy, and outline some of the key issues for expanding the debate about waste management.

The issue of public attitudes to waste is extremely important. Recycling and incineration dominate the letters I receive on waste, with letters about incineration far outnumbering letters about recycling.

It is clear from my postbag that – in the public imagination – waste incineration means pollution. Many people are apprehensive about the prospect of an increase in incineration, and many more might be worried if a new incinerator is planned in their area. Partly, people remember the bad reputation of the old generation of incinerators, closed down or replaced in the early 1990s. And partly people know waste can be dealt with in a number of other ways, such as recycling or landfill.

We need to get over to them the real issues in this debate. Fundamentally, many of us fail to see the link between the rubbish we produce and the need for waste treatment. We all generate waste, but few of us consider its impact.

The key challenges for waste management are waste reduction, diverting waste from landfill, and increasing recycling.

Reducing waste is the best way to manage waste, but we will also increasingly need to recover value from the waste we do produce. This principle underpins the national waste strategy we published last month. Probably the most important new measure in the strategy is the introduction of statutory targets for local authority recycling. Authorities will be required to double their current recycling rate in the next three years, to almost triple in five years, and to reach 30% by 2010. At the same time there is a

target to recover or recycle 45% of municipal waste by 2010. The targets will be reviewed and made even tougher if technology improves. Incidentally, we do not intend to count re-use of incinerator ash as household recycling for the purposes of these targets.

In the next two decades, the EU landfill Directive will require the UK to reduce the amount of biodegradable municipal waste sent to landfill to just 35% of such waste produced in 1995. This will leave the UK with an enormous amount of waste to be managed in other ways. Even with a very rapid increase in recycling, and a successful campaign to limit the growth in waste, the Government believes this cannot be achieved without some increase in energy from waste.

It is worth noting that, even with a very significant increase, we would still have lower levels of incineration than many of our European neighbours. Currently, only around 8% of municipal waste is incinerated in this country, and only around 5% of commercial and industrial waste. In contrast, OECD data indicates France incinerates around 32% of its municipal waste, and Denmark around 54%. This is way beyond UK plans.

The need to divert waste from landfill will inevitably mean new waste management facilities – of all kinds. New facilities will include new materials recovery facilities, composting plants and energy from waste plants. None of these facilities are popular neighbours if you happen to live nearby. But concern about energy from waste plant can clearly spread well beyond the immediate area.

People are most concerned about the potential effect of emissions on human health. Opposition to incineration is beginning to gather its own momentum, however. In particular, opposition to waste incineration is often much stronger than opposition to other industrial plant which might, in fact, produce more pollutants.

I welcome the independent and balanced approach that has been taken by the National Society for Clean Air in this area. In the 1980s the Society – rightly – campaigned against clinical waste incinerators as one of the worst polluting processes of the time. Since then, the older, more polluting generation of incinerators have been closed, and major advances have been made in reducing pollution from waste incineration. Incinerators built to today's tough standards are light years from their unsatisfactory predecessors. And I am glad that the NSCA agrees waste incineration is no longer a major offender on emissions.

We need to communicate the progress that has been made more widely. In fact, waste incineration is one of the most technically developed waste management options available at this time. It is also among the most strictly regulated. The

Hazardous Waste Incineration Directive, and the Waste Incineration Directive will tighten standards still further across Europe – although in most respects UK municipal waste incinerators already meet the new tougher standards. The Waste Incineration Directive will tighten controls on dioxin emissions tenfold.

I know that Dr Maynard (Department of Health) will address health issues in greater depth in his presentation. But I would like to comment briefly on dioxins. These chemicals are becoming more high-profile. My Department, with the help of other Government Departments and Agencies, is currently in the final stages of developing a new position paper on dioxins in the UK, to be published later this year. This will examine changes in emissions and exposure in the UK over the last 10 years and address the impact of changes in scientific thinking about dioxins. It will also aim to identify gaps in our knowledge and propose mechanisms for determining whether, and if so, what actions are needed to further reduce exposures. This work will take account of recent international studies.

We also need to communicate the potential environmental benefits of energy from waste, especially in comparison to landfill. Many people are unaware that municipal waste incinerators in the UK recover value from waste by generating electricity, or that incineration can provide heat for homes and businesses. In our view more should do so. Energy from waste can help displace the use of more polluting fossil fuels, and help to achieve our aims to meet - and exceed - our obligations under the Kyoto Protocol on greenhouse gases.

I have touched on some of the main barriers to public acceptance of incineration, and on some of the key messages that we need to communicate. I believe a more realistic and informed debate will result in greater public tolerance of incineration. The question is how to engage the public in that debate. This is the core issue for everyone involved in waste and I am sure it will be covered by many of today's speakers.

In my view, the way to achieve greater understanding is to ensure good planning, and get the public involved at all stages.

Not only will coherent, integrated local strategies deliver the most sustainable system. The creation of those strategies will also provide the best basis for dialogue with the public. In particular, I believe waste incineration will only be acceptable to the public if we get the relationship between incineration and recycling right.

Authorities and the industry need to plan to ensure that expansion in energy from waste does not "crowd out" recycling. Statutory targets for authorities to double recycling rates by 2003, and to continue to recycle even more, will make sure recycling gets off the ground quickly. But local authorities and the waste management industry need to plan ahead and build in flexibility, not rigid contracts which bind both parties for ever. Contracts need to be designed to ensure incineration does not compete with recycling. It may be desirable to "top-up" municipal waste sent for incineration with locally arising commercial waste, for example.

Incinerators also need to be the right size so local communities do not feel they are carrying the burden of incinerating waste from other communities. And it is important that - wherever possible - plans for waste incineration should involve Combined Heat and Power, which will substantially increase fuel efficiency and environmental benefit.

If local people can see their councils working together to develop integrated solutions which maximise recycling, and to assess all options on the basis of what is best for the environment and for health, they will engage in the debate constructively. Councils, working as leaders of their communities, can win support for energy from waste - where it can be demonstrated to be the best option.

This will be the key to delivering successful integrated solutions locally, regardless of the exact mix of waste management options in each locality.

Refinement of Urban Vehicle Emission Inventories, Using Instrumented Electric Vehicles

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This paper discusses the discrepancies between vehicle emissions calculated from conventional analysis and those derived by considering actual road speed data. Conventional methods use the average speed to ascertain vehicle emissions. This paper describes the use of an instrumented electric vehicle to acquire instantaneous speed and energy consumption data to derive emissions. A comparison of the two methods demonstrates that conventional analysis misrepresents vehicle emissions for congested roads.

Introduction

Emissions from vehicles are the major sources of airborne pollutants for a majority of cities in the UK. Inventories for vehicle emissions are derived using a constant rate model based on an average speed along a road link, which is determined from simulations of traffic flow. In reality, vehicle emission rates vary considerably with the drive cycles, i.e. accelerations, cruising, deceleration or idling. This paper describes a comparison of measured and modelled drive cycles along a typical busy urban road. Drive cycle parameters were measured using an instrumented electric vehicle. Vehicle emissions based on the measured and modelled drive cycles are calculated and compared. The findings of this preliminary study have revealed that there can be significant differences in estimated vehicle emissions using the two methods. The divergence is greatest when the measured flows become congested. The compilation of an emissions inventory based on drive cycles is discussed.

Background

The National Air Quality Strategy (NAQS) has given statutory duties to local authorities to undertake a review and assessment of their air quality, and to use predictive methods where necessary to assist this process up to the year 2005 [DETR, 2000]. For some local authorities Stage 3 of this assessment – the designation of air quality management areas – required completion by the middle of 2000. In order to undertake Stage 3, or any detailed urban air quality review, heavy reliance will be placed upon a representative emissions inventory. For most urban environments the dominant source of emissions is road vehicles.

At present, the average speed of the vehicle flow is the key parameter to estimating vehicle exhaust emissions and it is dependent upon a number of factors, e.g. delays at junctions, volume of traffic etc. For large urban road networks the average speed is derived using traffic models.

Drive cycle analysis undertaken in Leicester has established that the average speed in reality differs from the modelled values, particularly at peak periods and on congested links (or defined road segment). This has implications for the estimation of emissions.

The findings suggest that techniques may be required to determine the average speed for individual road links, which can then be used to validate transport models and in turn refine vehicle emission inventories.

The Electric Vehicle - ELCAT

The field studies were undertaken using an ELCAT electric vehicle. The research vehicle was originally converted to electric by ELCAT of Finland from a Subaru Sumo micro-van. Energy storage is from 12 Chloride Motor Power ET200 traction batteries giving a total of 72 volts and a range of 35 miles, with a top speed of 72 km/hr. The vehicle has an on-board charging unit and is charged from a dedicated charging point.

The parameters measured by the ELCAT include the following:

- Instantaneous speed
- Brake usage
- Power consumption
- In-vehicle carbon monoxide

All measurements were recorded using IP68 standard self-contained data loggers, running off an auxiliary 12-volt supply. The loggers have a two and a half hour high-resolution logging capacity and were synchronised so that data could be compared.

The speed sensor is an optical encoder with an output recorded by a pulse counter. The sensor measures distance per second, which was found to be more accurate than an analogue speed output device. The encoder is driven from the front wheel with allowances made for tyre pressure.

The traction battery voltage and current were measured using Hall Effect transducers and logged separately every second. The product of these two parameters gives instantaneous power consumption.

The brake sensor is connected to the brake light circuit and records when the foot brake has been applied sufficiently to illuminate the vehicle's rear brake lights. It does not record braking force; this is calculated indirectly in conjunction with recorded deceleration. This is a useful parameter for analysing driver behaviour.

To effectively use all of the above data it is important to record when each road link event occurs. This is achieved by a synchronised clock situated within the vehicle. Each time a particular event occurs, i.e. entering or leaving a link, one of two buttons is pressed placing a marker within the speed data. An audio facility also records any relevant information, e.g. congestion due to sporadic events – road works etc.

Comparison of Modelled and Measured Drive Cycles

This study examines the data collected from 25 out-bound journeys made between 5-6pm. All the journeys were made on midweek days and outside of school holiday periods from January 1999 to June 2000. The study area is a major road linking the M1 motorway with the centre of Leicester. The Narborough Road runs mainly through residential areas and is made up of a combination of different road classes segregated by a series of traffic and pedestrian light junctions. In order to undertake a detailed analysis of how drive cycles are influenced by traffic volume and junction delays at various parts of the journey, the road is divided into 14 individual links. The links are the same as those defined within the Leicester City transport model and the current Leicester emissions inventory.

Various traffic flow models are available depending on the specific requirements of the user, e.g. the size of the road network, the nature of the model input criteria, etc. For Leicester, the peak hourly traffic flow is estimated using the MVA TRIPS Suite Highway Model [MVA, 1998]. Major radials are modelled and validated in accordance with national guidance [DOT, 1996]. In the Leicester model, validation of speed is carried out for journeys as opposed to individual links. Each journey will therefore cross several road links, for which traffic flows are estimated. In TRIPS each road link is assigned a speed/flow relationship curve using the COBA road classification [DOT, 1996a]. The TRIPS model loads traffic onto the network links in a series of increments, and as traffic flow increases, speed decreases. The loading continues until the link is considered saturated, this occurs when the speed falls to the minimum speed cut-off as defined by the COBA classification. The model will then, if possible, shift the excess flow to another link to enable the traffic to continue to its original destination.

The average link speed in the Leicester emissions inventory is derived from this peak-hourly data. Therefore, the speed parameter is representative of the peak flow and not necessarily representative of the average traffic flow.

The main discrepancies between the modelled and actual speed are believed to occur when a link becomes very congested, thus reducing the average speed to below the minimum cut-off speed previously assigned. For road links where over capacity is regularly experienced and showing no evidence of driver delay-avoidance behaviour, a revised minimum speed can be assigned to assist future model runs. It is currently impractical however for local authorities to investigate the speed of traffic on all road links for the entire road network.

This research is concerned with measuring the average speed at peak traffic flow and under these circumstances link congestion inhibits the ability to achieve the speed limit. The links posing the greater potential threat to air quality are those passing through inhabited zones, which have a 48km/hr speed limit. It is important that an instrumented vehicle can measure and keep with the main traffic flow. The top speed of the ELCAT is 70km/hr. Links 1-12 have a 48km/hr speed limit, links 13-14 are 64-84 km/h respectively. On a dual carriageway for example, if the traffic stream overtakes a slow moving vehicle so must the ELCAT. On the other hand if the majority elect to stay behind, this preference must also be represented. Also, lane switching was avoided unless it was essential in reaching the desired destination. In the event that a particular speed across a link was judged to be unrepresentative, e.g. as would be the case in an extreme reduction of battery power, these occurrences were highlighted and the drive cycle data was excluded from the analysis. For the purposes of this research the ELCAT was able to keep with the main flow of traffic.

An example of a measured instantaneous drive cycle for one journey is shown in Figure 1. The drive cycle covers the length of the journey and clearly shows the transient events of acceleration, deceleration and idling. The time in which the vehicle spent on each link is shown by the stepped trace. From an instantaneous emissions viewpoint, this data is useful to determine the nature of the transient effects and where exactly they occur. Moving from left to right (city centre out-bound) the first peak represents a short dual carriageway followed by a series of links managed by traffic lights, the last two larger peaks are dual carriageways separated by a major traffic light junction.

The link profiles for each of the 25 journeys are shown in Figure 2. The time spent on each link is shown by the shaded bars. This enables the link times per journey to be directly compared and can be useful for examining delay times before and after the introduction of gating scenarios, i.e. alterations to traffic light sequences. For example, links identified as having minimal delays could with gating, increase their capacity flow to alleviate congestion on other links. This type of strategy could be used to shift sources of vehicle pollutants from one area to another, particularly to those road links that are more exposed to weather conditions to encourage better air dispersion.

The average speed per link based on twenty-five journeys is shown in Figure 3. (labelled ELCAT). For comparison, the TRIPS derived average speed currently used in the local inventory is also shown. Considering first the ELCAT

measured average speeds, junction signalling, pedestrian crossings, the inter-connectivity of roads and traffic volume all impact on traffic flow rates and more so during peak hours. As a link reaches capacity, the speed of the traffic flow decreases, e.g. link 4. Comparing now the current Leicester inventory with the measured data, only on link 6 is there exact agreement. The measured average speed on link numbers 1,6,7,8 and 13 are within +/- 22% of the inventory speed. Note that, all of these links are characterised by not terminating with a set of traffic lights or a pedestrian crossing. It seems to be the case therefore that, for this road, the measured average speeds compare more favourably with the estimated model values, for those links where delays are minimal. Link 4, showing the greatest divergence, terminates at a major crossroads managed by traffic light signals. This junction situated in a canyon, is the cross over point for vehicles travelling in and out, as well as across the city. Traffic in the evening rush hour is held on the link by vehicles queuing to filter left, and also by blocking back of the traffic from Link 5 opposite. Due to the delays affecting this junction, Link 4 frequently reaches saturation at peak hours.

For the two links making up the dual carriageway, the ELCAT recorded a speed of 10% higher than the estimated for link 13 and 36% lower for link 14. Traffic light signalling accounts for the difference in the latter.

Instantaneous Power Consumption

Because the ELCAT is electrically driven, consumption can be easily derived. From this it is possible to determine the instantaneous driving power of other vehicles in the flow and hence the instantaneous emissions from non-electric vehicles. Figure 4 compares the instantaneous power consumption of the ELCAT with the corresponding speed for actual driving conditions. As the vehicle initially accelerates power consumption is high, as the vehicle retards, the power consumption decreases. The reductions in power consumption at 15 and 63 seconds correspond to inflexions in the speed profile. A technique is under development which correlates power consumption to speed profiles to examine the effect of driver behaviour and traffic conditions on instantaneous power demand and hence instantaneous emissions. This technique will be the subject of a future paper.

Vehicle Emissions

It is misleading to compare estimations of vehicle emissions from measured and modelled (TRIPS) vehicle flows because the average speed and traffic flows are inter-related. Instead, a comparison of emissions based on measured and modelled average speeds per vehicle journey has been presented. This eliminates the confounding effects of flow rates from the comparison. Emission rates for measured (ELCAT) and modelled (TRIPS) journeys were derived for a light duty vehicle (LDV) and a heavy duty vehicle (HDV) taken from the Design Manual for Roads and Bridges guide [DETR, 1999].

The DMRB emission rates are a function of average speed and were compiled with data from the Transport Research Laboratory, the European Environment Agency and the Swiss/German Workbook on emission factors for road transport. For light-duty vehicles (LDVs), three vehicle categories are considered; petrol vehicles with and without catalysts and diesel powered vehicles. Each vehicle category is weighted with reference to the numbers of vehicles registered of a particular age, coinciding with the changes or proposed changes in exhaust emission standards. The factors do not consider cold-start emissions or the gradient of the local road surface. Heavy-duty vehicles were evaluated in a similar way. It should be noted that the data on heavy-duty vehicles (HDVs) emission rates are limited and a level of uncertainty exists for the derived emission factors [DETR, 1999]. Average speed is parameterised for LDVs and HDVs by 5km/h increments, i.e. an emission value is calculated for each speed interval from several drive cycles, and according to the DMRB it includes periods of acceleration, deceleration and idling.

Tables 1,2 compare the average emissions for a light and heavy-duty vehicle for the 4.32km journey across the 14 road links. The tables on each occasion show estimates of emissions for the measured quickest journey, the measured slowest, the measured average and the modelled (TRIPS) average. For both the LDV and HDV the measured average values for all the pollutants excluding NO_x for the LDV are nearer to that estimated for the slow journey. Also, for all emissions estimated using the TRIPS average speed, the values are lower than the measured average.

Table 1. Emissions per journey for a light duty vehicle

	Emissions per Journey [g]			
	Measured			Estimated
LDV	FAST	SLOW	AVE.	TRIPS
CO	15.80	24.33	21.18	14.05
NO _x	3.00	3.03	2.99	2.94
PM10	0.15	0.16	0.16	0.14
HC	2.49	3.67	3.24	2.24
Speed range km/hr	10 - 70	5 - 55	5 - 60	25 - 55

Table 2. Emissions per journey for a heavy-duty vehicle

	Emissions per Journey [g]			
	Measured			Estimated
HDV	FAST	SLOW	AVE.	TRIPS
CO	10.23	16.14	13.85	8.59
NO _x	73.19	100.65	91.04	65.78
PM10	2.56	4.10	3.49	2.20
HC	6.29	10.77	9.00	5.12
Speed range km/hr	10 - 70	5 - 55	5 - 60	25 - 55

For LDVs, the significant differences between the measured average and TRIPS occur for CO and, importantly, HC with an increase of 44.7%. This is due to the nature of emissions from LDVs. An inverse relationship causes higher emissions of CO and HC at lower speeds, whilst for both NO_x and PM₁₀ the emission curve is flatter for the speed range encountered. If overall journey times were to increase, particularly on links with existing delay, an increase of PM₁₀ may result, as LDVs emit higher levels of exhaust at these very low speed ranges.

The emissions estimated for the fast, slow and average journeys in Table 2 show an increase for all pollutants compared to the TRIPS journey times. Examination of the speed/emission curves for HDVs confirms that, for urban driving where the speed range is characteristically between 0-80km/hr, emissions will be higher. The most significant pollutant increases are for HC at 76% and PM₁₀ at 59%, both of which are increasingly giving rise to health concerns [Farmer, 1998].

Instantaneous Speed

The times recorded for the journeys emphasise the extent to which estimated pollutant emissions are sensitive to change in average speed. Measurements of the journey times are useful as an indication as to where traffic flows are congested and therefore more likely to contribute to higher emissions.

From the existing field data, it is possible to derive emissions based on instantaneous speeds rather than measured averages. This has the potential to offer a further level of refinement to the estimation of vehicle emissions. A study is underway to compare emissions derived using instantaneous speeds with both model speeds (TRIPS) and measured.

Conclusion

The research has so far highlighted the differences between estimated and measured average speeds on road links in Leicester. In particular, the findings suggest that emissions based on transportation models may be significantly underestimated for congested road links.

By using an instrumented electric vehicle it has been demonstrated how a range of traffic parameters can be collected and used for emission modelling.

The use of instantaneous speed data for the estimation of vehicle emissions was discussed. The management of air quality at local hotspots could benefit from the techniques described in this paper.

The recent adoption of electric vehicles into local authority vehicle fleets is a positive step to reducing local emissions and to raising public awareness of environmental issues. However, this research demonstrates that local authorities can go one step further by using such vehicles to monitor the effectiveness of traffic management schemes.

Further work

The data recorded for this study forms the basis of a long-term project which aims to characterise road types in terms of drive cycles. This will lead to a new approach for the refinement of existing vehicle emission inventories based on real world drive cycles.

The ELCAT is to be replaced in the near future with an electric vehicle with enhanced performance and the capability to monitor instantaneous emissions and road data referenced to geographical position (for GIS integration).

Acknowledgements

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Figure 1. Instantaneous drive cycle across 14 road links, single journey between 5-6 PM with a stepped indicator of link duration

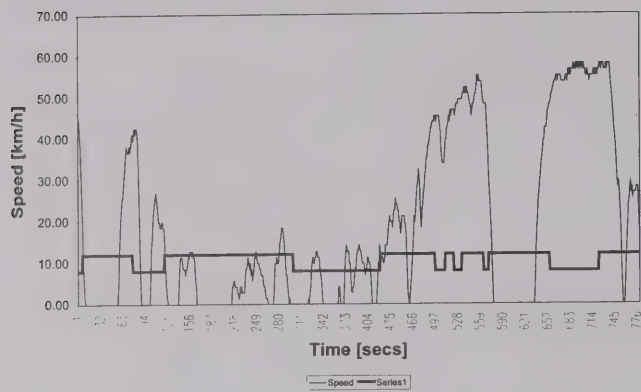


Figure 2. Duration on each link for each journey

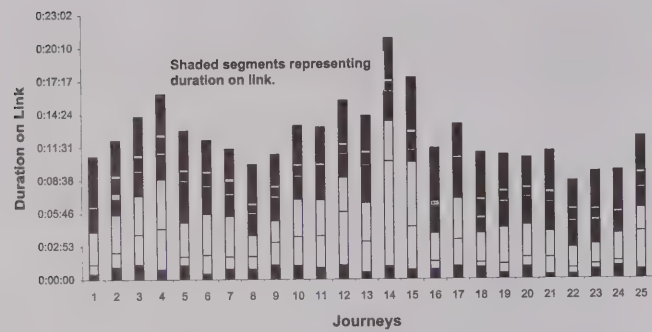


Figure 3. Average speed across 14 road links – current inventory (modelled) compared with measured drive cycles

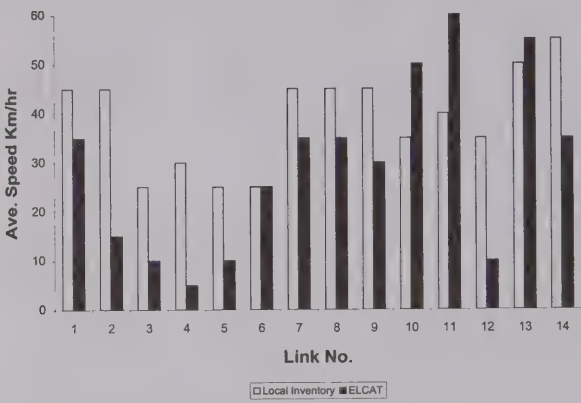
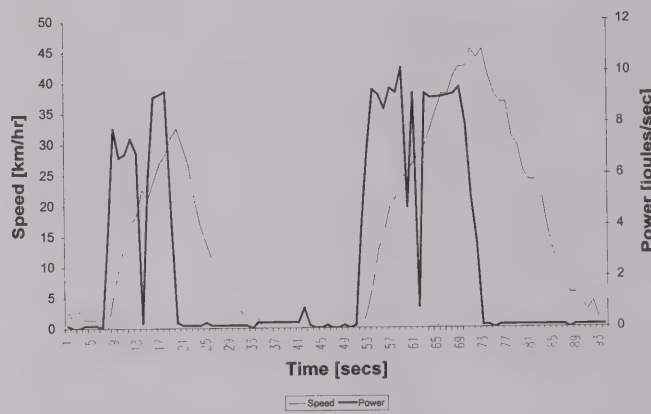


Figure 4. Power consumption compared to speed



Planning for Air Quality

Dalia Lichfield, with David Janner Klausner

Dalia & Nathaniel Lichfield Associates

Setting the Scene

In July 2000 some 100 senior executives sat through a two day international marathon in Oxford, even foregoing tea breaks, to discuss ways of reducing traffic pollution. They included local authorities' Councillors, Directors of Development, Transport and Environment, vehicle and fuels manufacturers, fleet operators - from taxis to Tesco's - Chamber of Commerce, and others: a clear tribute to the topicality of the issues. What brought them together was the interest of both public and private sectors in the potential for low emission fuels and vehicles.

The conference was convened by ALTER Europe, (chairman Stuart Holland) who had signed up over 130 European cities on the Florence Declaration - a commitment to advance clean, low emission zones, and encourage the conversion of fleets and private vehicle engines to cleaner fuels. The special role of ALTER is to facilitate joint procurement of low emission vehicles and fuels - bulk buying could lead to producers developing and providing cheaper products, which in turn encourages the wider use of the new technologies. Participants were encouraged by several reports from fleet operators who found that conversion costs were more than returned by lower fuel and maintenance costs within a short space of time. And they had a boost of confidence from an unexpected quarter: OPEC countries were expressing concern that the new breed of cleaner fuels (e.g. LPG, SD and CRT, electric and hydrogen) are becoming cheaper and will displace a good part of traditional petrol.

This gradual change may not be recognised by the wider public, but those concerned with air quality in the UK will be familiar with the National Air Quality Strategy, set to comply with EU air quality requirements that come into effect by 2005. The Strategy components are both national and local. The national deal with greenhouse effect gases, ozone depletion and with overall implementation of emission standards for stationary and mobile sources.

The role given to local authorities is to monitor local pollution and to operate Air Quality Management Areas (AQMA) to reduce emissions where pollution levels are forecast to exceed the EU standards. The timetable for this process is very strict. According to DETR guidelines (Local Air Quality Management - Guidance Notes, March 2000) local authorities should have completed their review and assessment of air quality by June 2000 and submitted the results to the DETR. By law, where local authorities identify areas that will have sub-standard air quality, they must include them in a declaration of AQMAs. These declarations are due in October this year - following consultation with the public and other stakeholders, and with neighbouring and regional authorities.

Having declared AQMAs, the local authorities have until the end of 2001 to prepare Action Plans designed to bring the air quality up to (and pollution down to) the required standards. Implementation and actual results are due in 2005 - in accord with EU Directives.

Some Impediments to Progress

It is at this point, with the designation of AQMAs and preparation of action plans, that proper engagement with the issues, and their wider implication, occurs in earnest. And it is at this stage that delays are beginning to appear. Many authorities are behind schedule in monitoring or have informed the DETR that the declaration of AQMAs will be delayed. The reasons fall into three broad categories: lack of suitable resources (financial, expertise & status), lack of information on measures available to reduce pollution; and difficulties at policy level (decision making, inter-departmental collaboration). The purpose of this paper is to shed light on some of these impediments to progress, and to show how the progress can be advanced by pursuing air quality management in the context of integrated socio-economic and environmental development planning.

The Role of Integrated Planning

The early monitoring and assessment stage is in technical terms a continuation of work on measuring and monitoring air quality that has become quite established over the past few decades. It can be handled as routine by, for example, an Environmental Health Officer. What comes next, however, is much more complex and requires difficult evaluation and choice: pollution emanates from a variety of sources - to what extent will the reduction of emissions from any of them reduce the overall pollution? Should emissions from vehicles (constituting on average about 50% of total pollution) be controlled by restricting the use of cars or by converting them to cleaner fuels? What are the side effects of such measures, and do any of them conflict with the council's other policies (e.g. access for all)? Which will be more acceptable to the public? How are other departments involved in effecting the changes? Etc.

As concern grew with the rising air pollution from the various sources it became apparent that air quality must be tackled more effectively. But policy makers, in view of their limited resources and sensitivity to public reactions, have to be assured that their choice of strategy is both correct and justifiable to the public. It cannot be a piece meal programme, but a method of integrated planning and evaluation cast in the current paradigm of social and economic as well as environmental sustainability,

accommodating diversity, involving all stakeholder groups, best value, and transparency. It is clearly an opportunity to break major new ground, establishing air quality as a unifying variable for a wide spectrum of local policies and decisions.

DETR has risen to the occasion by issuing impressive guidelines on how air pollution should be tackled within the planning system. As can be seen from its Guidance Notes a local authority, in preparing Action Plans, must:

- Involve all stakeholders (LA and wider) to ensure an integrated approach;
- Examine all possible measures, evaluating the extent to which they can exert control or influence air quality through specific measures;
- Balance regulatory and non-regulatory measures;
- Check cost-effectiveness of the various measures, given their respective contribution to improving air quality;
- Appraise and quantify the wider consequences of measures taken – environmental, economic, social and so forth.

In brief, the DETR expects a truly integrated approach, involving planning, consultation, weighing up all the consequences before selecting the "Best Value" option.

Mapping The Thinking Process

The Overview Diagram shows four main components of the thinking process when preparing for appraisal and selection of a strategy. This diagram reflects a computerised model, devised by Dalia & Nathaniel Lichfield Associates, that serves as a checklist for matters that need to be considered, as well as a repository for the data collected under each item.

(a) identifying the sources of pollution, including industrial (e.g. manufacturing processes; energy used); domestic (e.g. energy used, appliances, waste incineration); transportation (e.g. tailpipe emissions, but also brakes, tyres and road surfaces, haulage of loose materials, etc); and sources outside the council's jurisdiction (e.g. industry elsewhere, aircraft above).

When identifying the sources one must also identify who is controlling them and appreciate the reasons for their action, what might cause them to accept or to resist change.

(b) identifying the types and levels of pollution produced by the above sources, by categories and sub-categories. This is in practice the 'monitoring' stage of the AQMAs;

(c) considering the measures that could be used to reduce pollution. There are various measures that could be applied to each source of pollution (see Boxes 1 and 2). These measures can be operated via various spheres of action: *land use planning* (see Box 3), *operations*,

financial incentives, *political pressures*, and of course *transportation planning* (see Box 2)

Some examples: Polluting industrial operations can be controlled by *business licensing*, or by industry itself following public pressures or *financial* "sticks and carrots"; *financial* measures such as parking fees can affect shoppers' behaviour, and parking restrictions can also be exercised by *Planning* policies and *Development Control*.

What stands out here is the fact that most of these measures fall into the remit of different bodies: either various local authority departments inside, or others outside it. It is essential to register which of the measures are under the council's direct control, and which require steps to communicate with and convince outside bodies to act. As to measures that are within the council's direct control, these can only be effective if the council adopts an integrated ("joined up") strategy, and creates the means of integrating the air quality aspects within it (more about that below). And it is no less important to demonstrate an integrated strategy when attempting to convince external bodies of a need for action,

(d) Assessing the impacts that any measures will have, not only on the levels of pollution, but also their side effects on different groups in the community.

Some of these effects may be desirable (for example reduced traffic will also reduce congestion) and some will be detrimental to particular groups (e.g. limiting access to services for the old and disabled, or making bulk goods and food shopping quite difficult). See Box 4 for more examples.

Appraisal of Options: Feasibility and Evaluation

There are clearly a large variety of possible measures and means to reduce pollution and, as one of the conference participants said: "my head is swimming from all that choice but our resources are limited, so how do I choose the 'best value' measures?"

Although explicit 'Best Value' criteria for Air Quality Action Plans have not yet been developed by the DETR, some indication may be gleaned from the guidance booklets. As a general rule, sustainability is regarded in integrated terms - one has to consider not only the outcomes for air quality, but also for the social and economic environment. Feasibility testing of options is not mentioned in the DETR booklets. Perhaps it goes without saying that it is not worth assessing the outcomes of options that are not really feasible. 'Options' may relate to particular measures but are more likely to appear as 'strategies', linking a set of activities that support one another in a coherent scenario. Feasibility testing of options has several components. For example: Physical and operational feasibility (e.g. can the tubes take the load? is there space for the uses? Can

BOX 1 - EXAMPLES OF MEASURES TO REDUCE POLLUTION

Industrial Pollution

Control of polluting processes
Energy efficiency

Domestic Pollution

Insulation
Supplementary solar energy
Energy-efficient appliances
Non-polluting appliances
Waste management

Traffic pollution

Reduce the amount of vehicular travel,
Change mode of travel to less polluting transportation (trains, cycles etc)
Change technology of fuels/vehicles to lower emissions (ALTER Europe Project)
Improve traffic management to reduce length of trips, stops and starts.

Non Local Pollution – from land or air outside the LA area

Regional, national and international agreements on relevant measures
Air traffic management

BOX 2 - MEASURES TO REDUCE TRAFFIC POLLUTION CAN BE EFFECTED BY DIFFERENT MEANS

Reduce the amount of vehicular travel

Locating synergetic land uses close to one another
Financial dis-incentives, e.g. taxation
Organising working & domestic life to reduce the need to travel, e.g. teleworking

Change mode of travel

Improved public transport (cost, variety, speed, accessibility, seamless journeys)
Incentives (parking restrictions, financial incentives, road pricing)
Improved infrastructure for walking and cycling.

Change technology of fuels/vehicles

Stricter emission testing
Facilitate the supply of alternative fuels, e.g. by enabling fuelling stations; lower tax.
Facilitate production and purchasing of cleaner engines, e.g. the ALTER - ITEM initiative.
Restrict access to high emission vehicles, e.g. lorry bans, low emission Zones

Traffic management

Keep cars running at optimum efficiency

BOX 3 - WHAT TOWN PLANNING CAN DO TO IMPLEMENT MEASURES FOR REDUCED POLLUTION FROM TRAFFIC

Town planning has particularly rich offerings for the control of vehicular pollution. Here are some key examples:

Prediction Pollution

Through Environmental Impact Statements where appropriate

Land Use Location

Placing polluting industries where minimum impact; Placing traffic generators near public transport; Locating related uses close to one another (Housing - Employment - Shopping - Services - etc); Mixed use initiatives.

Dictating type of development

Energy efficient buildings; Pedestrian and Cycling routes; Designated public transport routes;

Operational Conditions and 106 Agreements

Demanding Company Green transport plans; negotiating contributions to public transport.

Area wide policies

Lorry bans; Clear, Home, and Pedestrian zones ; Clean/Low Emission Zones.

BOX 4 - EFFECTS OF POLICY: REDUCTION OF PARKING IN CITY CENTRE

Air Quality

Positive - likely to reduce number of private car journeys into city centre.

Access

Requires investment in substitute means of transport (cheap public transport, cycling and pedestrian routes); if ineffective: Employees & Business clients find access difficult; people with disabilities and young families - reduced access

Prosperity

Employees & businesses suffer costs and may relocate; One Local Authority loses rates and employment, another gains;

Equity

Reasonably fair policy, although it will discriminate in favour of businesses and individuals who have access to private parking, whose access will improve due to the fall in incoming visitor cars.

Community

The reduction in traffic volumes favours local communities - the street environment is more pleasant and there is less severance of communities by traffic

restrictions be enforced?); *financial* feasibility (are there the necessary resources?); *planning and safety* feasibility (e.g. is it acceptable by existing policies); *social and political* feasibility (e.g. will there be a fierce public reaction?). However there are likely to be several feasible measures or strategies. How can one choose between them?

Appraisal of Best Value Amongst Options

Our thinking process started with recognition of the sources of pollution and the *people* giving rise to them, whether business leaders or the travelling public. We must end this process with recognition of the *people* at the other end of

the process - those that will experience various outcomes of the measures we propose to implement. Any of these measures may have different consequences for different people (see an example in Box 4). For instance, a modal shift to public transport will benefit those breathing cleaner air, and will make a profit for private operators of public transport. But it could create hell for passengers unless there is investment in the system's capacity, and would make life difficult for people attempting to carry their food shopping home, unless supermarkets are obliged to offer a delivery service, or there is a growth in agencies offering such services.

There is a way of analysing the impacts on different groups in the community - service providers, businesses, commuters, school children, shoppers and many others - all have a legitimate right to be reckoned. The method of Community Impact Evaluation (CIE devised and operated by Dalia & Nathaniel Lichfield Associates) traces through the outcomes - both direct outcomes for air quality and ensuing health, and side effects of all kinds - and sets out a "balance sheet" of who gains and who loses from the options under consideration.

Diagram 2 - Community Impact Evaluation - illustrates this form of analysis: registering the various effects of the options (e.g. in terms of clean air, convenience of travel between various origins and destinations; safety, etc) and then identifying those groups who will experience the impacts (e.g. access to work and other activities, business operation, safety for children, socialising, costs, change in land values, etc.).

This appraisal can be used in all of the three steps in a planning process:

- Ex ante: in deciding on the best options before proceeding
- Interim: while the process is on-going, as following best value practice
- Ex post; to review a programme on completion.

Whichever the step, CIE is also a helpful means to public participation, i.e. involving the public in discussion of their reactions and views. It can do so because the form of analysis, as just indicated, analyses the outcome by each group affected, enabling less impacted groups to be invited to respond. However the final balance takes account also of those who have not come forward, rather than being dominated by vocal responders. For councillors who are concerned for their total constituency this can be of great help.

Integrated Planning - Skill and Organisation

Moving on from measuring and monitoring of pollution levels requires a truly integrated approach. Designating effective AQMAs (due in by October 2000) already requires some idea of the strategy to be pursued, and preparing Action Plans requires a full appreciation of the "thinking process" chart and the interactions between its components. The analysis of potential effects and impacts

will also be the foundation for "ancillary policies" (e.g. the food delivery) designed to mitigate undesirable impacts.

Integrated planning is a particular skill. Its main attributes are a dynamic and 'lateral' way of viewing the world, and the ability to enhance shared knowledge, perceptions and strategies amongst stakeholders of diverse remits and interest. Although these conditions can develop by trial and error when such stakeholders are forced to sit together, there are many techniques that can facilitate the process. As a starting point however there must be the will in the local authority to allow this process to take place, and the person with authority to set it up. The professional skills may come from within (e.g. the planning department) or using the assistance of consultants to enhance and develop the local authority skills. Their main contributions could be:

- Reading the wider map
- Communicating with the movers & shakers
- Introducing techniques for shared approach amongst stakeholders
- Assisting the formulation of options (+ expertise in specific fields)
- Feasibility & risk assessment
- Assessment of consequences & evaluation for "best value"
- Links to the ALTER network.

The ALTER And ITEM Contributions

One of the strategic dilemmas is likely to be the extent to which to embark on "car exclusion" policies or "low emission" policies. The rationale of low emission zones is that it is easier to bring about a shift in vehicle/fuel technology than to bring people to abandon the use of private cars altogether. In fact a combination of both measures is likely to give best results - subject to details and timing. Car exclusion to be effective and minimise public antagonism has to be based on sensible land use planning and investments in public transport - measures that involve a long lead time. The technological shift can provide an immediate result in air quality, but in the long term will lose its effect as the number of vehicles increase. Thus an overall approach would combine in the short term the less painful measures of car exclusion plus an emphasis on technology shift, and in parallel lay the foundations for the long term car reduction plans.

ITEM (Integrated Transport & Environment Management) is a purpose made company working with Alter Europe to provide assistance in the integrated planning process. It can also provide the data and connection into the ALTER Europe networks of Joint purchasing. Its professional skills are provided by Dalia & Nathaniel Lichfield Associates (integrated planning consultants).

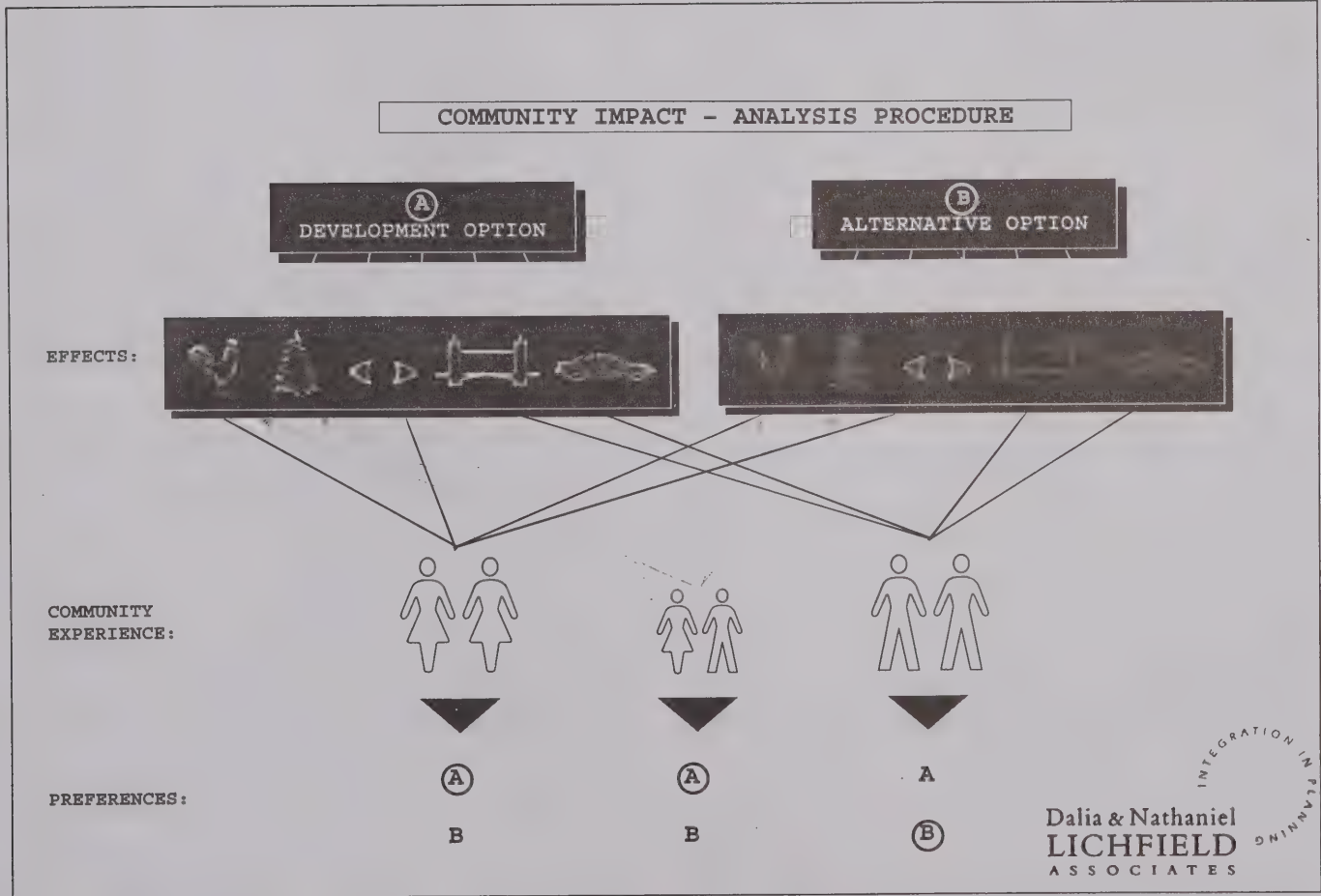
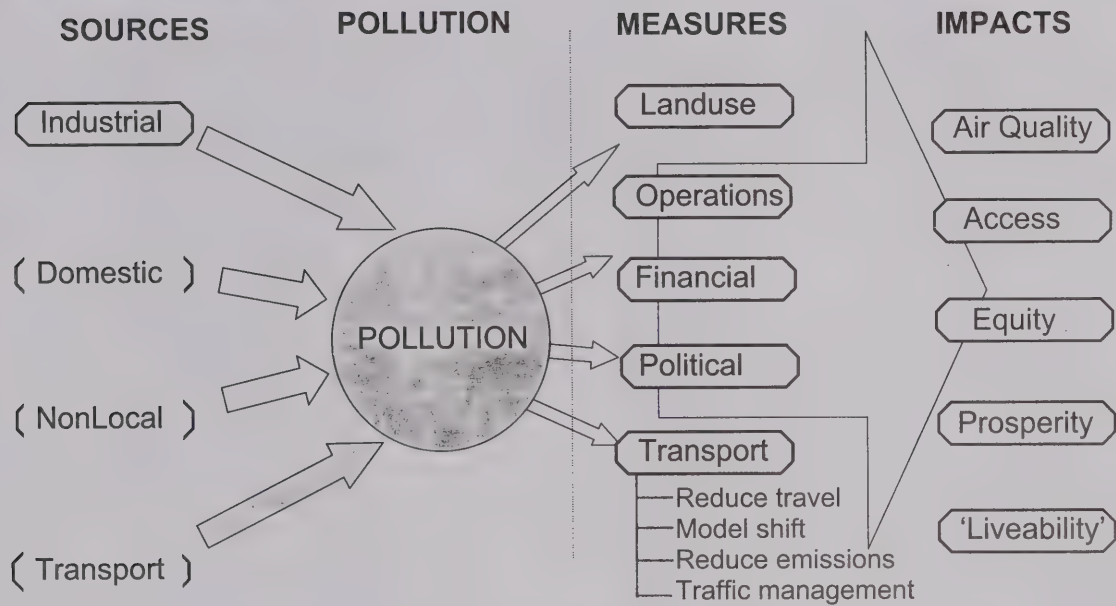
Dalia Lichfield with David Janner Klausner, of Dalia & Nathaniel Lichfield Associates dnla@dnla.demon.co.uk

Integrated Transport & Environmental Management

DNLA

Dalia Lichfield
020 7483 0724

Overview



UPDATE

EPAQS & Airborne Particles

The Expert Panel on Air Quality Standards (EPAQS) recent report*, published in June, addresses what is the appropriate measurement on which to base a standard for ambient airborne particles. The standard, recommended by the Panel in 1995, is based on measurement of PM_{10} . In their new report, the Panel conclude that this metric has stood the test of time and has allowed the demonstration of robust relationships between changes in concentrations of PM_{10} and health effects. They go on to recommend that in the absence of evidence that any alternative metric shows a closer and more reliable association with health outcomes, there is no pressing need to substitute one.

EPAQS also conclude, however, that there are good reasons to suppose that a major part of the toxic component of particulate air pollution resides in a fraction below about $1\ \mu m$ and that this fraction would be better represented by measurement of $PM_{2.5}$. Health studies in the UK have looked at daily changes in deaths and hospital admissions associated with daily changes in PM_{10} and $PM_{2.5}$. Current epidemiological evidence suggests that $PM_{2.5}$ and PM_{10} are equally effective for detecting and monitoring adverse health effects from particulate pollution in the general population. In these studies, to date, the levels of $PM_{2.5}$ and PM_{10} have been found to rise and fall so closely together that their associations with health effects are inseparable. There is some indication that the toxicity of PM_{10} resides largely in the $PM_{2.5}$ fraction, but because of methodological limitations, this is far from conclusive.

The Panel recommends that the development of a standard, which better represents the toxic component of the particle mixture, might be possible in the future with further research. For instance, it is possible that studies over longer periods of time, than have so far been possible, comparing PM_{10} and $PM_{2.5}$ and their association will resolve these difficulties. Other characteristics of particles, such as particle numbers or surface area, are also highlighted as features that may better represent the toxic component. They conclude that it is premature to consider such metrics for control purposes, and that there is insufficient data on which to base any such standard, but they should be introduced into future epidemiological research projects in order that such data will be available in the future.

In summary, the Panel recommends that the control of particulate air pollution by use of PM_{10} provides adequate protection of the health of the public. They conclude however that there are likely to be advantages in the use of a metric more representative of the toxic component in the future, and the UK research programme should be aimed at the better definition of this component.

NSCA's response to the consultation draft is available and can be obtained by contacting Sally May on 01273 878776, or by emailing SMay@NSCA.org.uk.

* Airborne Particles: What is the Appropriate Measurement on Which to Base a Standard (Draft for Comment)

Outdoor Equipment Directive

On 3 July, the Noise Emission in the Environment by Equipment for Use Outdoors Directive (2000/14/EC) was published in the Official Journal of the European Communities, signifying that it had come into force. The Directive sets noise emission limits for all types of outdoor equipment from lawn mowers to cement mixers and pneumatic drills, with its provisions becoming mandatory for manufacturers of such equipment from 3 January 2002. Copies of the Directive can be down loaded from the European Commission website at europa.eu.int/eur-lex/en/oj/2000/L16220000703en.html.

The Department of Trade and Industry's Standards and Technical Regulations Directorate has produced guidance notes for the Directive and these can be found at www.dti.gov.uk/strd; hard copies of the publications can also be obtained directly from DTI by calling their Publication Orderline on 0870 1502 500.

IPPC Regulations

The Pollution Prevention Control (England and Wales) Regulations 2000 (SI1973) finally came into force on 1 August 2000 – eight months after the deadline for transposing the 1996 Integrated Pollution Prevention and Control Directive into national legislation. Similar Regulations for Scotland are expected shortly.

The Regulations, which will eventually replace those for IPC and LAPC under the Environmental Protection Act, apply to all installations carrying out an activity listed in a Schedule to the Regulations – those with a greater potential to pollute (A1 installations) are to be regulated by the Environment Agency and the remainder (A2 installations) by local authorities; in Scotland all will be regulated by SEPA. The Regulations will require regulators to take account of a much wider range of impacts when considering whether to grant a Permit – including energy efficiency, noise and vibration, accident prevention and waste management practices. New installations are required to apply for a permit immediately and before 1 January 2001; existing installations are to be phased in by sector to 2007. Many existing Part B installations will now be covered by the PPC Regulations; the remainder, which will continue to be regulated for air pollution only, will transfer to control under the PPC Regulations between 1 April 2002 and 1 April 2004.

MEMBERS NEWS

Members – are we covering your news? Please check that your press office has Clean Air on its mailing list – or email your news direct to tbrown@nsca.org.uk

The **Met Office** is offering a new air quality forecasting service for local authorities. This enables councils to inform the public of likely pollutant levels from industry and transport sources. The service is already in use at **Wakefield DC**, where pollution forecasts are included on the council's website.

The Met Office is also promoting its new air pollution modelling system AERMOD, developed in association with Lakes Environmental. It combines local emissions data with meteorological information and takes into account local topography, including buildings. Info from the Met Office on www.met-office.gov.uk.

BP Amoco and **Ford** have been involved in a two-year partnership trial of alternative road transport fuels, working with Royal Mail. Liquefied Petroleum Gas (LPG) and Compressed Natural Gas (CNG) vehicles were run alongside conventional diesel and petrol vehicles. The trial showed that LPG and CNG vehicles both had reduced emissions of nitrogen oxides, particles and carbon dioxide, but there were considerable differences between the different types of LPG and CNG technologies. More info on Royal Mail environment initiatives: 0207 320 7314.

A project including **Celtic Energy** as a major partner has been awarded a Millennium Marque by the Tidy Britain Group. The project restored 360 hectares of despoiled and derelict land in East Merthyr. Much of the area has been landscaped, with sites for housing and industry.

Meanwhile **Newcastle City Council** is the latest fleet operator to opt for LPG, with 12 new vans. The council has investigated a number of alternative fuel options, including electric vehicles, but was impressed by the costs savings which LPG offers. More on 0191 211 5071.

Greenenergy is offering an increasing range of 'carbon services' including Carbon-Certified Electricity, combined heat & power plants (CHP), and renewable electricity

derived from hydro, wind and biomass to reduce CO₂ emissions, with a certified carbon content. More on www.greenenergy.com.

Monitoring equipment company **ETI** is promoting a new range of portable analysers, including the Perkin Elmer Photovac Voyager portable gas chromatograph (pictured). More on www.eti-group.com.



Divisional News

The South East Division has bid a fond farewell to its long-serving Secretary Joe Beagle, after an amazing 17 years in post. Joe will still remain on the Divisional Council. Meanwhile, Rob Gibson of LB Hounslow will take up the reins as Divisional Secretary. The Division collaborated with the Association of London Environmental Health Managers to run a very successful conference entitled Air Quality – London's Action Plan. Two hundred delegates attended the event, which featured the first speech by the Mayor's environment advisor Darren Johnson, and the launch of a video on air quality in London.

The Wales Division's next meeting will be on meeting the challenge of improving the Welsh Environment in the new millennium, on 20 October at the Cardiff Millennium Stadium. There will be a conference on the issue in the morning, followed by the Divisional AGM in the afternoon.

Future Events

5 OCTOBER – Environmental Challenges 2000

Annual conference of Colin Beeton Associates, Chartered Surveyors; contamination, brownfields and waste head the agenda.

Venue: Institute of Directors, London SW1

Details: Conference Administrator,
Tel: 01245 264172;
email: CBAConfer@aol.com

5 OCTOBER – New Thinking; New Solutions

5th Annual Conference of Greenpeace Business will provide showcase for a range of out-of-the-box thinking and potential breakthroughs that will create long term business propositions to help halt environmental damage.

Venue: The London Marriott Hotel, London W1

Details: Centaur Conferences,
Tel: 020 7970 4770

7 NOVEMBER – Sources of Environmental Information

One day training workshop on the range of information available from electronic sources, understand how information can be presented very subjectively and explore a variety of environmental databases.

Venue: The British Library, London.

Details: Maureen Heath,
Tel: 020 7412 7470;
email: maureen.heath@bl.uk

13-15 NOVEMBER – Groundwater Pollution

Three day course combining theoretical lectures and practical interactive sessions to introduce key concepts in investigating, monitoring and cleaning up groundwater.

Venue: The Crowne Plaza Hotel, Birmingham

Details: Penny Richards, IBC Conferences,
Email: cust.serv@informa.com;
website: www.informa.com/ka113

26-30 NOVEMBER – Environmental Management and Clean Air

14th IUAPPA Regional Conference being held in Peru and jointly organised by the Peruvian Society for Clean Air and Environmental Management and the Institute of Ecological Feasibility Studies (IDEFE). The conference will provide an international forum for not only identifying air pollution problems in the Andean Region, but more importantly to discuss current research and look for appropriate solutions.

Venue: Marriott Hotel, Miraflores, Lima, Peru.

Details: Maria, Ines Bello, General Manager, MIBA Event Coordinators, Pasaje San Martin, 142 Oficina: 303, Lima 18, Peru. Fax: (51-1) 447 1541; Email: idefe@terra.com.pe

28 NOVEMBER – Health & Well-Being: Does Our Environment Matter?

One day seminar providing an opportunity for exchange of ideas between health and environmental professionals from wide range of disciplines.

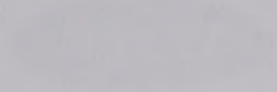
Venue: NSPCC National Training Centre, Leicester.

Details: Seminar Secretary, MRC Institute for Environment and Health.
Fax: 0116 223 1601;
Email: ieh@le.ac.uk;
website: www.le.ac.uk/ieh/update.html

CALL FOR PAPERS

26-31 AUGUST 2001 – 12th World Clean Air & Environment Congress

"Greening the New Millennium" is the theme of the 12th IUAPPA World Clean Air Congress, which takes place in Seoul and is being hosted by the Korea Society for Atmospheric Environment. The Congress will encourage discussion on the latest research in measurement, modelling and management of air pollution, and includes sessions on all aspects of air pollution policy, air quality management, waste management, vehicle emissions, sustainable development, and many more. The deadline for submission of abstracts is 25 November 2000. For a copy of the first announcement contact Loveday Murley at the IUAPPA Secretariat on Tel: 01273 878780 or Email: lmurley@nsca.org.uk, or iuappa@nsca.org.uk



2000

EPA Pollution Handbook

Handbook for the 21st Century
This handbook is designed to help you understand the many ways in which the EPA works to protect the environment. It covers a wide range of topics, including air quality, water quality, and hazardous waste. The handbook is written in a clear, easy-to-understand style, and includes many examples and illustrations to help you understand the concepts. It is a valuable resource for anyone who is interested in the environment and the work of the EPA.

DON'T FORGET THE ENVIRONMENT

When you buy a new car, you should also think about the environment. The car you choose can have a big impact on the air quality in your area. Look for cars that are labeled "EPA approved" or "EPA certified." These cars have been tested and found to meet the EPA's strict standards for air pollution. They are designed to run on less fuel and produce fewer pollutants than other cars. By choosing an EPA approved car, you can help to keep the air clean and healthy for everyone.

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EMISSIONS AND YOUR CAR: HOW TO OPERATE

There are many things you can do to help reduce the emissions from your car. First, make sure your car is properly maintained. This includes checking the oil, air filter, and spark plugs. A well-maintained car will run more efficiently and produce fewer emissions. Second, drive your car in a way that saves fuel. This means avoiding rapid acceleration and braking, and driving at a steady speed. Third, use the air conditioning sparingly. The air conditioning system can increase the amount of fuel your car uses, which means it will produce more emissions. By following these tips, you can help to keep the air clean and healthy for everyone.

The first of these is the fact that the air is not clean. It is full of dust, dirt, and other particles that are harmful to our health. These particles come from many sources, including cars, factories, and even our own homes. They can cause a variety of health problems, including asthma, bronchitis, and even heart disease. The second problem is that the air is not fresh. It is full of pollutants that give it a stale, smelly odor. These pollutants come from the same sources as the dust and dirt, and they can also be harmful to our health. The third problem is that the air is not pure. It is full of chemicals and other substances that are not natural. These substances can come from a variety of sources, including cars, factories, and even our own homes. They can cause a variety of health problems, including cancer, reproductive problems, and even neurological damage. The fourth problem is that the air is not clean. It is full of dust, dirt, and other particles that are harmful to our health. These particles come from many sources, including cars, factories, and even our own homes. They can cause a variety of health problems, including asthma, bronchitis, and even heart disease. The fifth problem is that the air is not fresh. It is full of pollutants that give it a stale, smelly odor. These pollutants come from the same sources as the dust and dirt, and they can also be harmful to our health. The sixth problem is that the air is not pure. It is full of chemicals and other substances that are not natural. These substances can come from a variety of sources, including cars, factories, and even our own homes. They can cause a variety of health problems, including cancer, reproductive problems, and even neurological damage. The seventh problem is that the air is not clean. It is full of dust, dirt, and other particles that are harmful to our health. These particles come from many sources, including cars, factories, and even our own homes. They can cause a variety of health problems, including asthma, bronchitis, and even heart disease. The eighth problem is that the air is not fresh. It is full of pollutants that give it a stale, smelly odor. These pollutants come from the same sources as the dust and dirt, and they can also be harmful to our health. The ninth problem is that the air is not pure. It is full of chemicals and other substances that are not natural. These substances can come from a variety of sources, including cars, factories, and even our own homes. They can cause a variety of health problems, including cancer, reproductive problems, and even neurological damage. The tenth problem is that the air is not clean. It is full of dust, dirt, and other particles that are harmful to our health. These particles come from many sources, including cars, factories, and even our own homes. They can cause a variety of health problems, including asthma, bronchitis, and even heart disease.



2000

NSCA Pollution Handbook

The essential guide to UK and European pollution control legislation

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Your card account will not be debited until your order has been despatched

Published February 2000

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National Society for Clean Air and Environmental Protection

44 Grand Parade, Brighton BN2 2QA

Tel: 01273 878770

Email: sales@nsca.org.uk

Fax: 01273 606626

DON'T FORGET THE ENVIRONMENT

A guide for incorporating environmental assessment into your project

This is the first of two books from the Environmental Analysis Co-operative (EAC), a group of about 50 organisations including the UK Environmental Agencies. Both are edited by Rod Perriman, formerly Her Majesty's Chief Inspector of Pollution and later in corporate environmental management with ICI and Zeneca.

The guide explains how managers of projects large and small can integrate planning with pollution control in their project development programmes.

£14.99, 1999/40 pages/A4 softback/ISBN 0 85295 422 0

EMISSIONS AND YOUR LICENCE TO OPERATE

A guide for assessing releases to the environment

The guide provides a framework for environmental assessment in the context of an IPC or IPPC application.

£29.99, 1999/140 pages/A4 softback/ISBN 0 85295 423 9

Both publications are available from

National Society for Clean Air and Environmental Protection

44 Grand Parade - Brighton BN2 2QA

Tel: 01273 878770

Email: admin@nsca.org.uk

Fax: 01273 6060626

New Leaflets from NSCA

Light Pollution

Artificial light is essential in our modern society –

- for illumination of streets, roads and hazardous areas
- for security lighting
- to increase hours of use for sports and recreation facilities
- to enhance the appearance of buildings

However, there is increasing concern about the problems that light can cause, and excessive lighting is a waste of energy and resources.

Intrusive Light

- can affect neighbouring properties

Skyglow

- overpowers the light of stars in the night sky – causing a headache for astronomers, and spoiling the view for the rest of us

NSCA's new 12 page Light Pollution Leaflet gives guidance on preventing light pollution and potential remedies to light pollution problems

We are grateful to NSCA Scotland for assistance in compiling this leaflet.

Air Pollution Laws

There are many sources of air pollution and the legislation that governs these can be confusing. This new 12 page NSCA leaflet provides a clear guide to air pollution laws in England and Wales.

Legislation is similar in Scotland and Northern Ireland, but may differ in points of detail.

It covers:

- Air Quality Management
- Sources of information on air pollution
- Motor Vehicles
- Domestic Fires
- Industrial Air Pollution – LAPC, IPC, IPPC

Light Pollution and Air Pollution Laws are available from NSCA

Cost: £8.50/100 £60.00/1000 Sample copies available free of charge

NSCA

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